

# **A Strategy to Build a Freshwater Pipeline from Turkey to Jordan**

By:  
Tyler Hoffman  
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## SCENARIO

For the purposes of this project, I am positioning myself as an analyst with a fictitious organization, *The Water Solutions Group*, a non-profit organization that is involved in researching ways to alleviate water shortages and address water related issues around the world. I am in Amman, Jordan presenting my research on alleviating Jordan's freshwater crisis to an open forum of Jordanian government officials, water researchers, academics and the media.

I will present information concerning the status of Jordan's water crisis and support my recommendation for a transnational pipeline with economic, commercial, legal and political analyses. Finally, I will present a strategy for implementing my recommendations.

## EXECUTIVE SUMMARY

Jordan is running out of freshwater and is actively looking for ways to augment its domestic supply. Jordan's water shortage is due to a lack of sufficient domestic water resources compounded by mismanagement and inefficient distribution. Jordan is currently making up its water deficit by drawing down non-renewable aquifers, and it is estimated that the country's renewable water deficit will reach 360MCM by 2020.<sup>1</sup> Jordan is at the center of the water dispute over the scarce waters of the Jordan River Basin and, with the exception of those living in the Occupied Territories, is likely to be affected the most severely of all Middle Eastern countries if a long-term solution to its water deficit is not found.

This paper proposes solving Jordan's water crisis through building a transboundary water pipeline that will transport water from the Seyhan and Ceyhan Rivers in the Taurus mountains of southern Turkey to Amman, Jordan via Syria. This pipeline will have the capacity to deliver enough water to meet Jordan's 2020 deficit and provide water for years to come.

Turkey has been selling water to its neighbors for years and the Seyhan/Ceyhan pipeline is the most commercially attractive option for supplying Jordan with additional freshwater. It is more sustainable than pumping down aquifers, and more cost effective than desalination, delivering water by tankership or waterbag. Any effort to supplement Jordan's freshwater supply must be accompanied by the Government of Jordan taking the necessary policy steps to ensure the collection of water tariffs in order to cover the cost of new water and its delivery. Steps are currently being taken in Jordan to make this a reality.

Water is a contentious issue in international trade and there are several international bodies of law that pertain to its use and sale, including the GATT. Although the absolute status of water in the context of international trade is unclear, there are several key legal issues that are addressed in order to effectively analyze the transfer and sale of water across international borders.

The construction of a transboundary pipeline is a major commercial and political undertaking. This paper addresses and analyses the political relationships between Jordan, Syria and Turkey and presents arguments for why the Seyhan/Ceyhan pipeline could become a reality. Although these country's share disputes, such as Turkey's use of the Euphrates River to the detriment of Syria and Jordan's bad relations with Syria since signing a peace treaty with Israel in 1994, the necessary political elements are in place to facilitate the construction of the pipeline.

This paper concludes with a strategy for persuading the three parties to engage in negotiations concerning the construction of the Seyhan/Ceyhan pipeline based on the internal mobilization of political, business and social stakeholders throughout the three countries.

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<sup>1</sup> Jordan Ministry of Water and Irrigation, [www.mwi.gov.jo](http://www.mwi.gov.jo).

## ISSUE

**The Problem:** Jordan is running out of freshwater. Current freshwater demand in Jordan is about 1.2 billion cubic meters per year. Current renewable supply is about 900 million cubic meters (MCM) per year resulting in a 300 MCM per year deficit. This deficit is being made up by drawing down non-renewable aquifers and implementing water saving measures such as rationing and improving the water infrastructure in metropolitan areas. It is projected that Jordan's annual water demand will increase to 1.647 billion cubic meters by 2020 while supply, augmented by wastewater reuse, dams, indigenous pipeline projects, and improved municipal infrastructures, is projected to be only 1.287 billion cubic meters, leaving a deficit of 360 MCM. Water deficits of this magnitude are unsustainable and will negatively impact Jordan's ability to maintain standards of living and economic growth.

There are several ways to supplement Jordan's freshwater supply. They are, developing large-scale desalination capacity, importing water in bulk by tankership or waterbag, or building a water pipeline from Turkey to Jordan. Each of these options involves several larger policy issues. To be successful, all of the options require effective management of Jordan's freshwater resources. Pursuing water by tankership, waterbag or pipeline requires the additional decision to rely on water from beyond Jordan's borders.

**The Solution:** Supplement Jordan's freshwater supply with water from a pipeline originating at the Seyhan and Ceyhan Rivers of southern Turkey and crossing Syria into Jordan. The Seyhan/Ceyhan Pipeline has the potential to not only meet, but exceed, Jordan's freshwater needs for years to come at costs significantly lower than alternatives.

## JORDAN'S WATER CRISIS

Jordan's freshwater supply is precarious at best. The country's average rainfall is roughly 20 centimeters (7.9 inches) per year. In contrast, San Francisco receives about 20 centimeters of rain in just 2 winter months.<sup>2</sup> Since 1970, however, Jordan's rainfall has averaged a mere 10 centimeters (3.95 inches) per year.<sup>3</sup>

Jordan's water deficit will have a particularly hard impact on the municipal, industrial and tourism sectors of the economy. While demand for water in the agricultural sector is expected to remain fairly stable between now and 2020, demand in the municipal and industrial sectors is expected to increase by over 100% from a current demand of roughly 350 MCM/year to 757 MCM/year. Evidence of the growing need for water is that real GDP growth in Jordan has exceeded 3% in each of the last three years (1999-2001) with the largest gains occurring in the manufacturing and services areas.<sup>4</sup> As a result, Jordan must augment its water supply in order to keep pace with expected demand across the country. According to Water Minister Hazem Nasser, Jordan is designing its national industrial strategy around water and its availability. He has pointed out, however, that increasing investment and industrial projects have contributed to Jordan's water crisis, and it is feared that a lack of water and its potentially high cost could discourage future investors.<sup>5</sup>

### **Current Sources of Freshwater in Jordan:**

For the purposes of this study, sources of freshwater in Jordan can be broken down into two categories; renewable and non-renewable. Renewable sources of water include the Jordan River, the Yarmouk River, and multiple underground basins. Jordan's main non-renewable source of water is the Disi Aquifer in southern Jordan which will eventually run dry. Wastewater re-use is a growing source of renewable water, but it is best utilized in the agricultural sector as human consumption of this category of water poses health risks.

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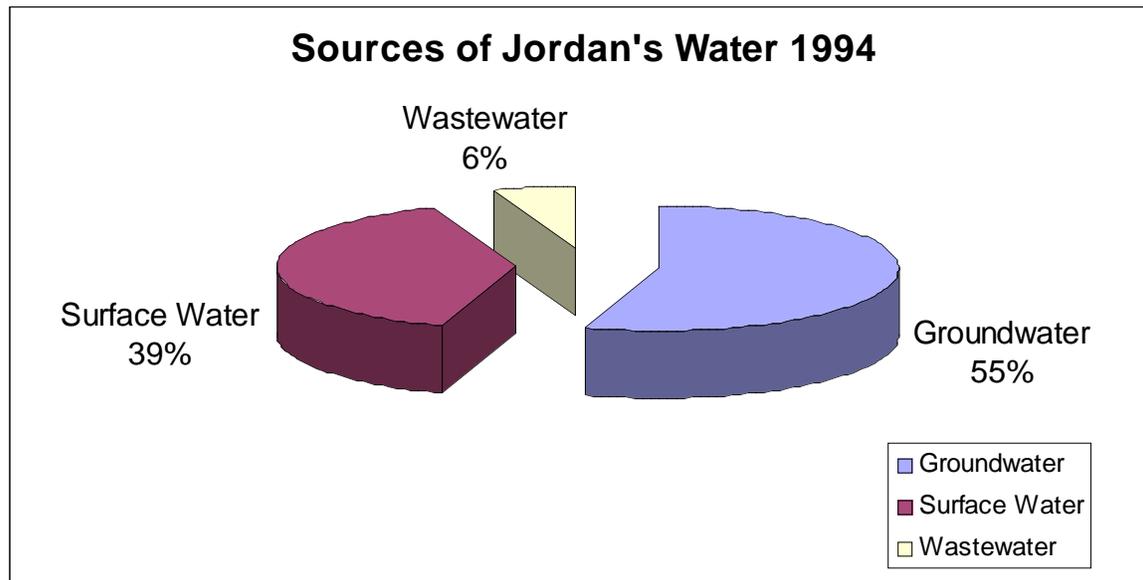
<sup>2</sup> USA Today, <http://www.usatoday.com/weather/climate/usa/calif/wsanfmis.htm>.

<sup>3</sup> Remarks by Dr. Barney Popkin at Bechtel, San Francisco, Fall 2002.

<sup>4</sup> U.S. Department of State, "2001 Country Reports on Economic Policy and Trade Practices – Jordan", Bureau of Economic and Business Affairs, February 2002.

<sup>5</sup> Jordan Times, November 27, 2002.

The following chart illustrates Jordan's sources of water by category:



**Source:** *Committee on Sustainable Water Supplies for the Middle East, Water for the Future*, (1999, National Academy Press, USA). Pg. 49.

### Water Use in Jordan:

Nearly 80% of Jordan's total population of about 5 million people lives in urban areas in the central and northern highlands. Amman, Jordan's capital and most densely populated city in the country is located in this area. Most of Jordan's total surface water is located and collected in this region from the lower elevations of the Jordan and Yarmouk Rivers.

Since the 1940's, per capita water availability in Jordan has dropped by 94%. Jordan has less than 200 cubic meters of renewable freshwater available per person per year with some estimates placing it as low as 90 liters per person per day.<sup>6</sup> This includes supplies for personal consumption, agriculture, and industry. It is generally held that countries are considered "water stressed" if per capita availability is less than 500 cubic meters per person per year (1370 liters), and availability below 1000 cubic meters (2740 liters) per person per year is considered to impede economic development and harm human health.<sup>7</sup> In comparison, Middle East countries as a whole average 1250 cubic meters (3425 liters) per person per year.<sup>8</sup> The following chart demonstrates Jordan's precarious water position compared to its immediate neighbors and the United States:

<sup>6</sup> Embassy of Jordan in the U.S., [www.jordanembassyus.org/new/jib/factsheets/environment.shtml](http://www.jordanembassyus.org/new/jib/factsheets/environment.shtml)

<sup>7</sup> Hussein A. Amery and Aaron T. Wolf, *Water in the Middle East – A Geography of Peace*, (USA, University of Texas Press, 2000). Pg. 51.

<sup>8</sup> *The Hashemite Kingdom of Jordan Update. Fourth Quarter 2001*, The World Bank Group. Pg. 11.

**Per Capita Water Availability in 2000 (meter<sup>3</sup>)**

<b>Country</b>	<b>Meter<sup>3</sup> Per Capita/Year</b>	<b>Liters Per Person/Day</b>
West Bank	93	255
Saudi Arabia	116	318
<b>Jordan</b>	<b>143</b>	<b>391</b>
Israel	449	1,230
Syria	2,761	7,560
Turkey	3,118	8,542
Iraq	4,776	13,100
United States	8,801	24,110

*Source: The World Bank, 2002 World Development Indicators. Pg. 151-152.*

Demand for freshwater has outpaced renewable supply in Jordan since the early 1990's. At that time, estimated annual demand of 875 MCM per year was nearly equal to estimated supply. As the population of Jordan increased, the demand for freshwater became more intense. According to the Jordanian Ministry of Water and Irrigation, projected freshwater supply, demand, and resulting deficits through 2020 are as follows:

**Water Supply and Demand Totals and Deficits (MCM)**

<b>Year</b>	<b>Total Requirement (MCM)</b>	<b>Total Supply (MCM)</b>	<b>Deficit (MCM)</b>
1998	1205	898	(307)
2005	1321	1042	(279)
2010	1436	1250	(186)
2015	1536	1283	(254)
2020	1647	1287	(360)

*Source: The Hashemite Kingdom of Jordan Water Sector Review Update. The World Bank, February 15, 2001. Pg. 5-6.*

**Pressure on Jordan's Freshwater Resources:**

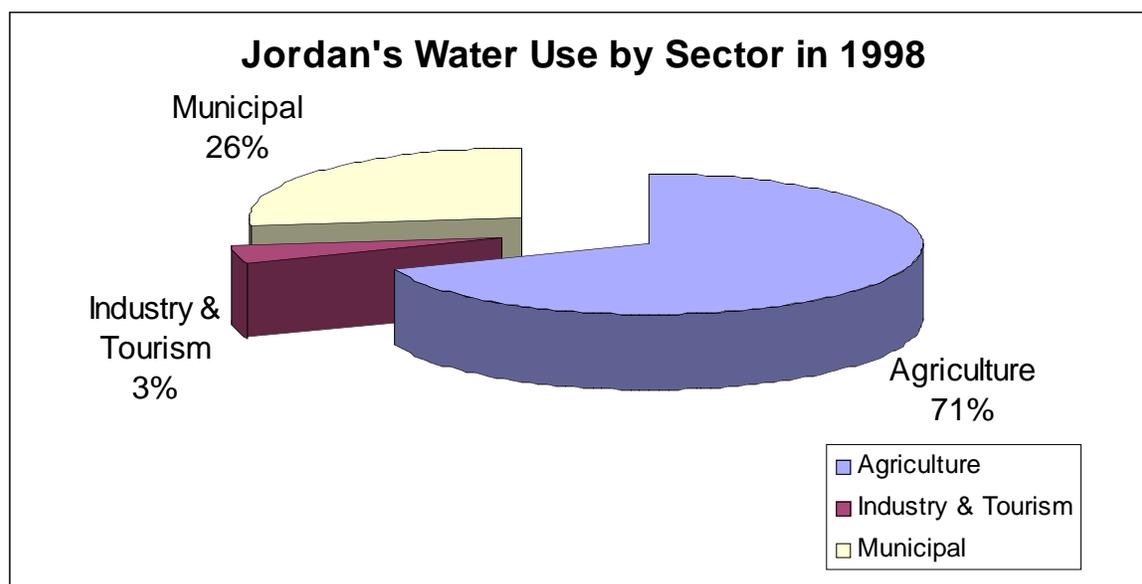
Jordan is one of the poorest countries in the Middle East. Per capita GNP in 1993 was only US \$1,190 and 2001 estimates place it only marginally higher at \$1,500.<sup>9</sup> As traditional agriculture has been unable to support the country's growing population, Jordan has experienced a large migration of people from rural areas to the country's few large cities. In 1980 the population of Jordan was 2.2 million with this figure growing to 4.1 million by the mid-1990's. At this time, 68% of the country's 4.1 million people were concentrated in urban areas.<sup>10</sup> As of 2000 the population of Jordan was 4.9 million

<sup>9</sup> Hussein A. Amery and Aaron T. Wolf, *Water in the Middle East – A Geography of Peace*. (USA, University of Texas Press, 2000). Pg.22, and *Background Notes – Jordan*, U.S. Department of State, January 2002.

<sup>10</sup> Population Reference Bureau 1995. Taken from Hussein A. Amery and Aaron T. Wolf, *Water in the Middle East – A Geography of Peace*. (USA, University of Texas Press, 2000). Pg.22.

with a projected annual growth rate of about 3%. It is estimated that Jordan’s population will reach 6.8 million by 2015.<sup>11</sup>

As a point of reference, Jordan’s water use in 1998 was broken down according to the following chart:



*Source: The Hashemite Kingdom of Jordan Water Sector Review Update, The World Bank, February 15, 2001. Pg. 4.*

The following chart shows projected water deficits by sector based on expected requirements versus expected supply in coming years.

**Water Supply vs. Requirements in Jordan 1998-2020 (MCM)**

Year	Municipal and Industry (MCM)	Agriculture (MCM)	Total National Requirement (MCM)	Total National Supply (MCM)	Deficit (MCM)
1998	342	863	1205	898	(307)
2005	463	858	1321	1042	(279)
2010	533	904	1435	1250	(186)
2015	639	897	1536	1283	(254)
2020	757	890	1647	1287	(360)

*Source: World Bank Report, Water Sector Review Update, February 2001.*

As the data indicates, demand in the municipal and industrial sectors in 2020 will increase by over 100% from 1998 levels. That same year total supply will not account for total demand in all three consumption areas, resulting in a huge estimated deficit of

<sup>11</sup> *The World Bank 2002 World Development Indicators.* Washington, DC. Pg. 49.

360 MCM. While it is possible for Jordan to cover this deficit by overdrawing aquifers as it is currently doing, this is not sustainable in the long-run and new sources of water must be found.

**Water Use in the Agriculture Sector:** The agriculture sector accounts for the largest quantity of water used in Jordan. In 1998, agriculture accounted for nearly 70% of all water used. In 2000, the agricultural sector used over 600 MCM of water and accounted for 2.2% of Jordan's GDP that year. As the data indicates, water demand in the agriculture sector is expected to stabilize at about 890 MCM in 2020. This is an increase of only 27 MCM from 1998 levels and is expected to be the result of implementing more efficient farming and water distribution technology.

**Water Use in the Industrial Sector:** Industrial demand for water has remained low in past decades due to Jordan's relatively small industrial sector. However, water use jumped in the early 1990's to about 45 MCM per year, and to 60 MCM in 2000. Despite low water usage relative to the municipal and agriculture sectors, the industrial sector, including manufacturing, accounted for 40.4% of GDP in 2000.<sup>12</sup> This figure is expected to rise significantly as Jordan's industrial sector grows.<sup>13</sup>

**Water Use in the Tourism/Hotel Sector:** Jordan's economy relies in part on a large hotel and tourism sector which currently contributes roughly 10% of annual GDP. Over the past decade, Jordan has been substantially developing its tourism infrastructure, particularly around historical sites and the Dead Sea. Regional stability is the key to growth in this sector and there are great expectations that if a comprehensive, regional peace agreement is reached Jordan will reap tremendous financial benefits. The number of hotel rooms in Jordan has increased from 12,100 in 1997 to 16,800 in 2000.<sup>14</sup> There are plans to build an additional 15,000 hotel rooms in the Dead Sea region in the near future.<sup>15</sup> Occupancy levels have been increasing dramatically as the number of occupancies went from 2.25 million in 1998 to 2.5 million in 1999, and there are expectations that this figure will reach 3.6 million in 2003 depending on the regional political situation.<sup>16</sup>

**Water Use in the Residential Sector:** The residential (municipal) sector accounts for the second highest annual consumption of water in Jordan. In Amman, where the largest proportion of the Jordanian population lives, water is delivered only once a week. It is estimated that nearly 50% of all water that is intended for use in the residential sector is considered "unaccounted for water" (UFW) as it is lost in the municipal system due to leaky pipes and poor infrastructure. Each cubic meter "unaccounted for water" (UFW)

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<sup>12</sup> Munther J. Haddadin, "Water Issues in Hashemite Jordan", *Arab Studies Quarterly*, Vol. 22, Number 2, Spring 2000. Pg. 66, and The World Bank, "Jordan at a Glance", September 18, 2002.

<sup>13</sup> Hussein A. Amery and Aaron T. Wolf, *Water in the Middle East – A Geography of Peace*. (University of Texas Press, 2000) Pg.26.

<sup>14</sup> Jordan Projects for Tourism Development, <http://www.jptd.com.jo/aboutus.htm>

<sup>15</sup> "The Dead Sea, Ancient Treasure, 21<sup>st</sup> Century Opportunity", Jordanian Ministry of Water and Irrigation and Ministry of Planning, 2002. Pg. 7.

<sup>16</sup> Jordan Projects for Tourism Development, <http://www.jptd.com.jo/aboutus.htm>

places an added burden on Jordan's water resources. Water use in the residential sector is expected to more than double in 2020 over 1998 levels.

### **Recovering Costs in Jordan's Water Sector:**

Municipal, industrial and related water use in Jordan is regulated by the Water Authority of Jordan. Water operations in the agriculture sector of the Jordan Valley, where most of Jordan's agriculture activity occurs, are managed by the Jordan Valley Authority. Both of these agencies are operating at a financial loss due to a disparity between high operation costs and weak revenue collection from water users.

Any water project such as the Seyhan/Ceyhan pipeline will be capital intensive and covering these, as well as long-run operation and maintenance costs, must be a priority. A strong revenue collection mechanism is the most logical way to generate these revenues and reforming the current collection mechanism will be required to meet this goal. The government of Jordan is currently working in conjunction with the World Bank to improve collection procedures. This issue will be presented and discussed in more detail in the sections on Commercial Background and Commercial Analysis.

### **Efforts to Increase Jordan's Freshwater Supply:**

Jordan is engaged in numerous water projects to enhance the country's overall freshwater capacity (See Appendix 1). Jordan plans to invest JD1.6 billion (\$2.3 million), or about 4.2% of GDP between 2000-2005 for this purpose. This investment plan is front loaded in which spending in 2002-2003 will likely exceed 5% of GDP.<sup>17</sup> The total amount of additional freshwater gained through all of the projects in Appendix 1 is 314 MCM. Population growth and economic expansion will make the net impact of these efforts on Jordan's total water deficit minimal. Following are examples of major projects Jordan is carrying out to enhance its water supply:

**Amman Water Infrastructure Renovation:** Jordan recently received \$55 million in the form of a World Bank loan to renovate the municipal water infrastructure in the greater Amman area and transfer management to a private entity. The French water management company, Suez, gained the initial contract. This four year project aims to improve efficiency in the water distribution system, rehabilitate the city's water network, repair meters, reduce unaccounted for water (UFW) by at least 25%, and increase sales revenue.<sup>18</sup>

**As-Samra Wastewater Treatment Center:** The As-Samra Wastewater Treatment Center is located 40 kilometers north of Amman and is the world's largest wastewater treatment facility. This facility began operating in 1985 and was designed to treat 68,000 cubic meters of water per day (24.8 MCM per year). Due to rapid population growth in

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<sup>17</sup> The World Bank, *Hashemite Kingdom of Jordan Update, Fourth Quarter, 2001*, Pg. 14.

<sup>18</sup> The World Bank, *Project Appraisal Document on a Proposed Loan in the Amount of U.S. \$55 million to the Hashemite Kingdom of Jordan for an Amman Water and Sanitation Management Project*, February 17, 1999. Pg. 4.

Amman and the surrounding area, this facility has been operating at overcapacity and is treating over 170,000 MCM per day (62.1 MCM per year), nearly three times above capacity, resulting in deteriorating water quality.<sup>19</sup> A \$153 million renovation and expansion project is currently being implemented at the facility and should be completed by 2005.<sup>20</sup>

**The Unity Dam:** The \$136 million Wihdeh (“unity”) dam project will stop the flow of a portion of the Yarmouk River on the Jordan-Syria border and store up to 110 MCM of water. 50 MCM per year of this water will be allocated for domestic use while 20 MCM/yr will be allocated to irrigation. As previously agreed, Syria will not have access to any of the water resulting from this project as Jordan is paying for the construction of the dam in its entirety. Additionally, Syria does not rely heavily on water from the Yarmouk River to meet its national water needs.<sup>21</sup>

**The Disi-Amman Conveyor:** The Disi Aquifer, located in southern Jordan near the Saudi Arabian border, is Jordan’s largest source of non-renewable sub-surface water. Water from this aquifer is currently pumped 325 kilometers north to Amman for consumption.<sup>22</sup> In 1998, 300 MCM of water was taken from the Disi Aquifer but there are plans to use more.<sup>23</sup> The Disi-Amman conveyor (pipeline) is currently under construction at a projected cost of \$588 million to supply Amman with an additional 100 MCM per year of water from the Disi Aquifer.<sup>24</sup> It is undetermined how long the Disi Aquifer will remain viable as conflicting estimates place the life of the aquifer between 40 and 150 years.<sup>25</sup>

**The Red-Dead Canal and Pipeline:** Not included in Appendix 1 is a plan that has been put forth by the Jordanian and Israeli Governments to construct a canal and pipeline system from the Dead Sea to the Red Sea located on the Jordan-Israel border. This project entails a pipeline system originating in Aqaba, Jordan’s only outlet to the Red Sea, to carry seawater roughly 200 kilometers inland to the Dead Sea for the purposes of desalination, power generation, and to refill the rapidly shrinking Dead Sea. The level of the Dead Sea has dropped roughly 20 meters in the past 40 years from 392 meters below sea level to 412 meters below sea level. If this pattern continues over the next ten years the Dead Sea will lose over one-third of its total surface area, receding to 650 square kilometers from 1,000 square kilometers recorded as recently as the 1960’s.<sup>26</sup>

The Red-Dead system is projected to carry 1.8 billion cubic meters of saltwater with 850 MCM of this targeted for desalination and distribution between Israel and Jordan. The

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<sup>19</sup> Japanese Ministry of Foreign Affairs located at,

[www.mofa.go.jp/region/middle\\_e/peaceprocess/ewg/mission9903/jordan2.html](http://www.mofa.go.jp/region/middle_e/peaceprocess/ewg/mission9903/jordan2.html)

<sup>20</sup> USAID movie on Jordan, GET TITLE FROM BARNEY POPKIN.

<sup>21</sup> “Turkish company wins water pipeline contract”, *Jordan Times*, 30 July, 2002.

<sup>22</sup> *The Hashemite Kingdom of Jordan Update. Fourth Quarter 2001*, The World Bank Group. Pg. 11.

<sup>23</sup> Ibid.

<sup>24</sup> The World Bank, *The Hashemite Kingdom of Jordan Water Sector Review, Vol II, Annexes C-N, Annex C, Attachment 1*. October 15, 1997.

<sup>25</sup> Remarks by Dr. Barney Popkin at Bechtel, San Francisco, Fall 2002.

<sup>26</sup> *Jordan Times*, March 5, 2002.

proposal indicates that two-thirds of this desalinated freshwater (560 MCM) will be piped to Amman and the remaining third (290 MCM) to the West Bank and Jerusalem. Desalination plants will be powered mainly with hydro-electric energy generated by utilizing the elevation difference between the hills surrounding the Dead Sea and the shoreline. As pipeline water falls from 126 meters above sea level to the banks of the Dead Sea at 400 meters below sea level roughly 550 megawatts of electricity will be generated and used to power desalination and pumping facilities with additional electricity being made available to local communities.<sup>27</sup>

The initial cost of this project is cited at roughly \$4 billion, with the cost of the pipeline being an estimated \$800 million and the installation of initial desalination and distribution facilities an additional \$3 billion.<sup>28</sup> If implemented, this project is expected to meet Jordan's freshwater needs up to about 2030.<sup>29</sup>

### **Is it Possible to Import Freshwater from Turkey?**

Turkey has an abundance of freshwater from its numerous streams and rivers. The headwaters of both the Tigris and Euphrates Rivers originate in Turkey and the country is considered by some to be an emerging regional "hydro-power". Since the mid-1980's, Turkey has made several offers to sell some of its water to needy neighbors. Turkey currently ships about 6.8 MCM/year to Turkish controlled Northern Cyprus via tankerships and waterbags.<sup>30</sup>

The Manavgat River in southern Turkey is responsible for 4.5 billion cubic meters per year of freshwater runoff. The city of Manavgat, which lies on the Mediterranean near Antalya, is the site of a dam and a \$150 million dollar, 186 MCM per year freshwater treatment and transfer station.<sup>31</sup> The facility was completed in the late 1990's and is designed specifically for water exports. The Manavgat facility consists of a series of pumping and treatment stations where water is extracted from the Manavgat River and sent to either a treatment and purification plant or directly to a filling station for export depending on what the buyer specifies.<sup>32</sup>

As of 2000 the Manavgat transfer station could supply 180 million cubic meters per year of water for export and that figure is expected to rise.<sup>33</sup> In August of 1999, Turkish President Demirel, once an opponent to the sale of Turkish water, offered to sell Israel up to 140 billion cubic feet (4 billion cubic meters) of water a year from the Manavgat

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<sup>27</sup> "The Dead Sea, Ancient Treasure, 21<sup>st</sup> Century Opportunity", Jordanian Ministry of Water and Irrigation and Ministry of Planning, 2002. Pg. 12, 15.

<sup>28</sup> Ibid. Pg. 17.

<sup>29</sup> Ibid. Pg. 15.

<sup>30</sup> "Turkey thirsts to export excess water; Mideast: Sales to other countries in the parched region could boost its power as well as income", *The Los Angeles Times*, 6 August, 2000.

<sup>31</sup> *World Tribune.com*, September 2, 2002.

<sup>32</sup> "Turkey thirsts to export excess water; Mideast: Sales to other countries in the parched region could boost its power as well as income", *The Los Angeles Times*, 6 August, 2000.

<sup>33</sup> Scott Peterson. "Turkey's plan for Mideast peace. Two major current conflicts are stalled over water issues. Turkey, with more water than it needs, has a plan", *The Christian Science Monitor*, 18 April 2000.

River.<sup>34</sup> The water, which Israel desperately needs, would be shipped the 400 miles between Manavgat and Israel by either tanker or waterbag. Israel followed through with Turkey and recently signed a deal to supply it with 50 MCM/year of water each of the next 20 years.<sup>35</sup> As of November 2002 the price of this water was not yet determined.

### **Water Potential of the Seyhan and Ceyhan Rivers:**

The combined average annual flow of the Seyhan and Ceyhan Rivers in southern Turkey is 15.19 billion cubic meters. A portion of their waters is utilized along the course of the rivers while the remaining water drains into the Mediterranean Sea.<sup>36</sup>

## **ECONOMIC BACKGROUND**

The following section will present economic issues relevant to the construction of the Seyhan/Ceyhan pipeline. Issues include Jordan's economic growth, water use by sector

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<sup>34</sup> "Turkish president offers water to solve Israeli shortage", *U.S. Water News Online*, August 1999, [www.uswaternews.com/archives/arcglobal/9turpre8.html](http://www.uswaternews.com/archives/arcglobal/9turpre8.html)

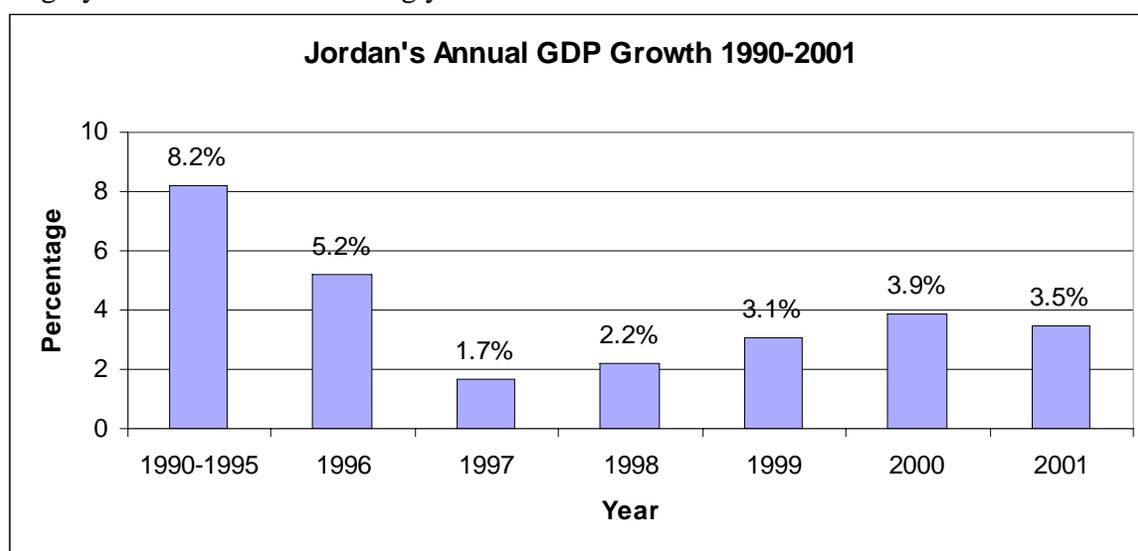
<sup>35</sup> "Israel-Turkey strike 20-year water deal", *Associated Press*, 7 August 2002.

<sup>36</sup> Mehmet Tomanbay, "Turkey's Approach to Utilization of the Euphrates and Tigris Rivers", *Middle East Quarterly* Volume 22, Number 2, Spring 2000. Pg. 85. Actual data from State Hydraulic Works, "Turkey's Hydroelectric Energy Potential and Current Situation", Ankara, 1998.

of the economy, current tariff schedules for water, and economic issues for Syria and Turkey regarding the pipeline.

### **Economic Growth in Jordan:**

Jordan's average economic growth in the early 1990's averaged over 8% per year. This growth has slowed to an average of just over 3% per year and is expected to continue at roughly this same rate in coming years.

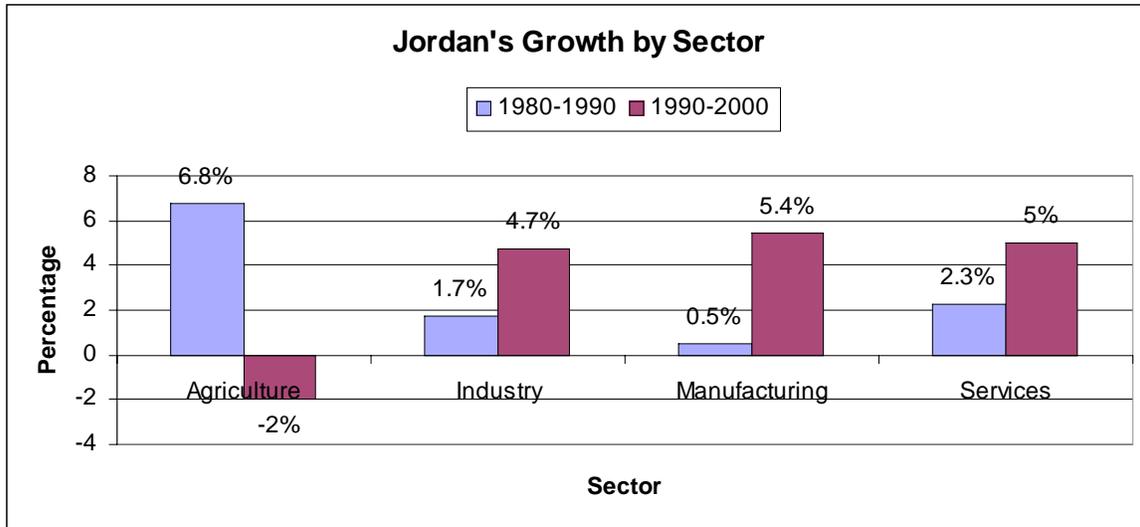


**Source:** The World Bank, World Development Indicators, 1997 – 2002.

The following two charts indicate Jordan's water use by sector in 1998, which totaled 1,224 MCM, and water use by sector in 2020 which is projected to be 1,647 MCM. As a point of reference, in 2000, the agricultural sector used over 600 MCM of water and accounted for 2.2% of Jordan's GDP that year. The industrial sector, including manufacturing, used 60 MCM and accounted for 40.4% of GDP that year.<sup>37</sup> The municipal, hotel and tourism sector combined accounted for about 400 MCM of water. Of this, the hotel and tourism sector contributed to roughly 10% of GDP that year.

Economic growth by sector of the economy over the past 20 years is as follows:

<sup>37</sup> Haddadin, Munther J., "Water Issues in Hashemite Jordan", *Arab Studies Quarterly*, Vol. 22, Number 2, Spring 2000. Pg. 66, and The World Bank, *Jordan at a Glance*, 18 September 2002.

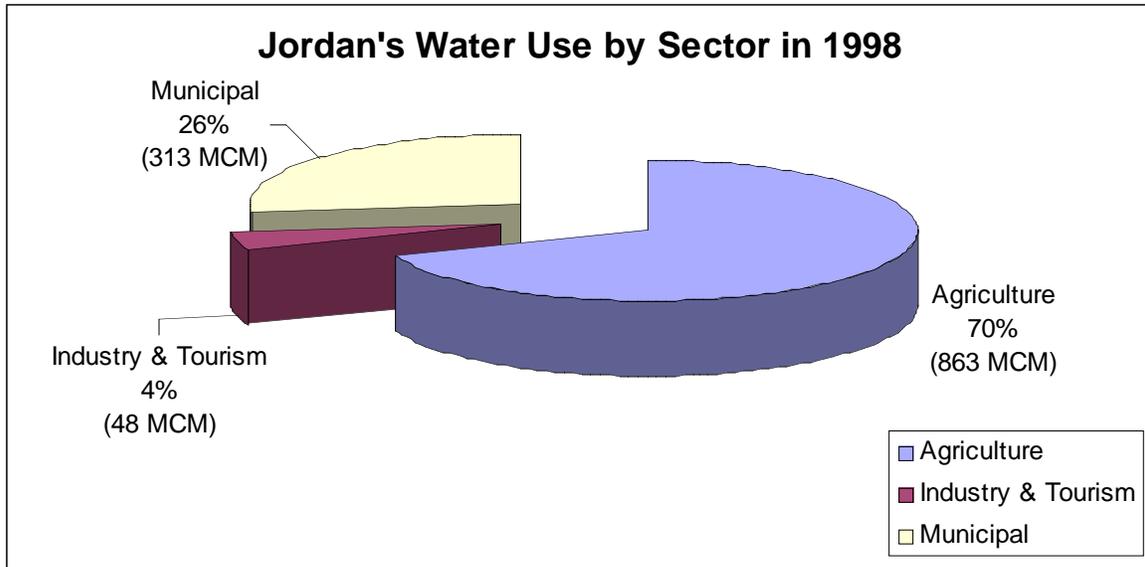


*Source: The World Bank, World Development Indicators, 2002. Pg. 205.*

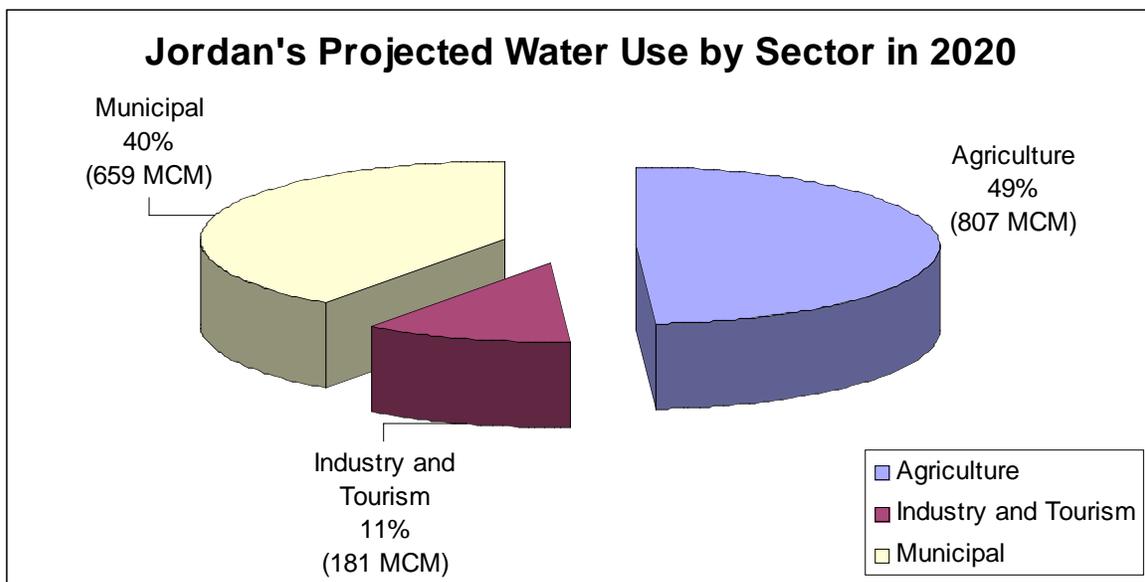
As the data indicates, new growth is concentrated in industry, manufacturing and services, with growth in the agriculture sector posting negative numbers. In the tourism sector alone, as part of services growth, Jordan saw the number of tourists rise from 572,000 in 1990 to 1.42 million in 2000, and increase of over 100%.<sup>38</sup>

Jordan's water use by sector in 1998 and projected water use in 2020 are displayed in the following charts.

<sup>38</sup> *The World Bank 2002 World Development Indicators, Pg. 375.*



**Source:** *The Hashemite Kingdom of Jordan Water Sector Review Update, The World Bank, February 15, 2001. Pg. 4.*<sup>39</sup>



**Source:** *The Hashemite Kingdom of Jordan Water Sector Review Update, The World Bank, February 15, 2001. Pg. 4.*<sup>40</sup>

According to projections by the Jordanian Ministry of Water and Irrigation, water use in 2020 will be broken down as follows:

<sup>39</sup> Data obtained for this graph is a compilation of inconsistent information from *The Hashemite Kingdom of Jordan Water Sector Review Update, The World Bank, February 15, 2001*. For example, percentages offered in the World Bank report are not consistent with numerical data. However, the percentages offered and the numerical data are very close and any inconsistency may be the result of rounding errors.

<sup>40</sup> Ibid.

Sector	Use in MCM
Agriculture	890
Municipal	576
Industry and Tourism	181

**Source:** *The Hashemite Kingdom of Jordan Water Sector Review Update, The World Bank, February 15, 2001. Pg. 4,6.*

### The Agriculture Sector:

The majority of Jordan's agricultural production occurs in the Jordan Valley which accounts for about 73% of total irrigation sector water use.<sup>41</sup> The Jordan Valley is bordered by the Jordan River to the west and the East Mountains to the east. It extends north to south a distance of 104 kilometers from Lake Tiberias to the Dead Sea varying in width from 4 to 16 kilometers. Average annual rainfall in the Jordan Valley is about 260mm, however, most agricultural production is sustained through irrigation due to a short rainy season. Vegetables are the primary product grown in the valley, specifically tree borne fruit, tomatoes, eggplants, potatoes, squashes, cucumbers, peppers, onions, cauliflower, cabbage, and beans.<sup>42</sup>

The Jordanian government is attempting to expand its total cultivatable land. However, water use in the agriculture sector is only expected to increase from about 860 MCM in 2000 to 890 MCM in 2020 due to the adoption of more efficient methods of water use. This is a sign of stabilization of water consumption in the agriculture sector and efforts by the Jordanian government to allocate less water proportionately to this sector.

The following chart indicates financial returns on water by sector according to a 1997 World Bank study, , *The Hashemite Kingdom of Jordan Water Sector Review, Vol II, Annexes C-N*. The data indicates that the lowest returns per cubic meter of water are in the agricultural sector while municipal sector returns are about 50% higher and industrial sector returns are over 500% higher.

### Financial Returns on Water by Sector

Sector	JD/meter <sup>3</sup>	and	\$/meter <sup>3</sup>
Agriculture – Jordan Valley	0.986		\$1.38
Agriculture - Highlands	0.832		\$1.16
Municipal	1.500		\$2.10
Industrial	5.000		\$7.00

**Source:** *The World Bank, The Hashemite Kingdom of Jordan Water Sector Review, Vol II, Annexes C-N, October 15, 1997. Annex C, Attachment 2, Pg. 8.*

### Opportunity Costs of Water Use:

<sup>41</sup> Radwan A. Al-Weshah, "Optimal Use of Irrigation Water in the Jordan Valley: A Case Study". (Netherlands, Kluwer Academic Publishers, 2001). Pg. 332.

<sup>42</sup> Ibid. Pg. 333.

The following chart indicates the opportunity cost of water use by sector according to the same 1997 World Bank study. The data indicates that the use of a cubic meter of water in the agricultural sector incurs the greatest opportunity cost, while the use of a cubic meter of water in the municipal sector results in a slightly smaller opportunity cost. The opportunity cost for water use in the industrial sector is dramatically lower than in the two competing sectors.

### Opportunity Costs of Water Use by Sector

Sector	JD/cubic meter and \$/meter <sup>3</sup>	
Agriculture	2.215	\$3.10
Municipal	2.070	\$2.90
Industrial	1.289	\$1.80

*Source: The World Bank, The Hashemite Kingdom of Jordan Water Sector Review, Vol II, Annexes C-N, October 15, 1997. Annex C, Attachment 2, Pg. 8.*

Patterns of water use and existing tariff structures result in negative returns on investment for the Jordan Valley Authority (JVA), the water management body of the Jordan Valley. The estimated average cost to supply irrigation water in the Jordan Valley from 1990-2000 was \$0.52 per cubic meter, \$0.23 of which consisted of operation and maintenance costs. During this period the government subsidized this water at a rate of about \$0.35 per cubic meter leaving the remaining \$0.17 to be recovered by the JVA. Current water cost in the Jordan Valley is based on a progressive scale as follows:

Usage Level (meters <sup>3</sup> )	Tariff (\$ per meter <sup>3</sup> )
0-1000	\$0.0114
1001-2000	\$0.0171
2001-3000	\$0.0286
3001 +	\$0.0500

*Source: Jordan Valley Authority, 2002.*

As the JVA tariff structure indicates, the largest tariff recovered per cubic meter of water used is \$.05, for the use of 3001+ cubic meters per billing cycle. As noted above, this is well below the cost to produce and deliver it. As a result of production and delivery costs outpacing revenue recovered, the JVA has consistently incurred financial losses.<sup>43</sup>

<sup>43</sup> Mohamad Shatanawi and Amer Salman, "Impact of Full Cost Recovery of Irrigation Water on the Farming Economics in the Jordan Valley". University of Jordan, Amman, 2002. Pg. 6.

### The Municipal and Industrial Sectors

Jordan currently charges the following tariffs per cubic meter of water in the industrial, hotel and municipal sectors:

<b>Sector</b>	<b>Tariff (\$ per meter<sup>3</sup>)</b>
<b>Industry<sup>44</sup></b>	\$2.00
Within Qualifying Industrial Zone <sup>45</sup>	\$2.10
<b>Hotels<sup>46</sup></b>	\$1.40
<b>Residential<sup>47</sup>(meter<sup>3</sup>)</b>	<b>Greater Amman (\$ per meter<sup>3</sup>)</b>
1-20	\$2.84 (total)
21-40	\$0.20
41-50	\$0.25
51-60	\$0.34
61-70	\$0.44
71-80	\$0.53
81-90	\$0.62
91-100	\$0.72
101-150	\$0.95
151-200	\$1.21
>201	\$1.21
<b>Jordan Valley Agriculture<sup>48</sup>(meter<sup>3</sup>)</b>	<b>Tariff (\$ per meter<sup>3</sup>)</b>
0-1000	\$0.0114
1001-2000	\$0.0171
2001-3000	\$0.0286
3001 +	\$0.0500

Water use in the municipal sector is expected to increase in coming years as Jordan's population increases and standards of living rise. As Appendix 1 indicates, numerous projects are currently underway to upgrade infrastructure and harness more water for the municipal sector. In the greater Amman area it is estimated that 50% of the water directed toward the municipal and industrial sectors is unaccounted for due to leaky pipes, an aging water network, and inefficiency in metering.<sup>49</sup> Although improvements in infrastructure and capital intensive projects are being implemented which will result in less wasted water and more supply, overall demand for water will still outpace renewable

<sup>44</sup> This figure is based on published rate per cubic meter according to the Central Bank of Jordan, <http://www.jordaninvestment.com/resource-data.htm>

<sup>45</sup> This figure is based on published rate per cubic meter in Qualifying Industrial Zones, [www.jordaninvest.com/5a.htm](http://www.jordaninvest.com/5a.htm).

<sup>46</sup> Radwan A. Al-Weshah, "Optimal Use of Irrigation Water in the Jordan Valley: A Case Study". (Netherlands, Kluwer Academic Publishers, 2001). Pg. 337.

<sup>47</sup> Jordan Ministry of Water and Irrigation.

<sup>48</sup> Jordan Valley Authority, 2002.

<sup>49</sup> The World Bank. *Hashemite Kingdom of Jordan Update, Fourth Quarter 2001*. Pg. 12.

supply as the population increases. Therefore, these water enhancing improvements will have no impact on Jordan's total water deficit.

Jordan's water problems are compounded by the fact that the location of its subsurface supplies of high-value water are often great distances from municipal and industrial centers, and lower-value water that is best utilized in the agriculture sector is located in municipal areas. For example, a project is currently underway to pipe water for municipal use in Amman from the Disi Aquifer in southern Jordan, 325 kilometers from Amman. Other projects are underway to exchange low-value water in municipal areas with high-value water in rural areas. By exchanging low-value water with high-value water, Jordan will be able to utilize its high-value water in sectors of the economy that experience the highest economic returns and lowest opportunity costs.

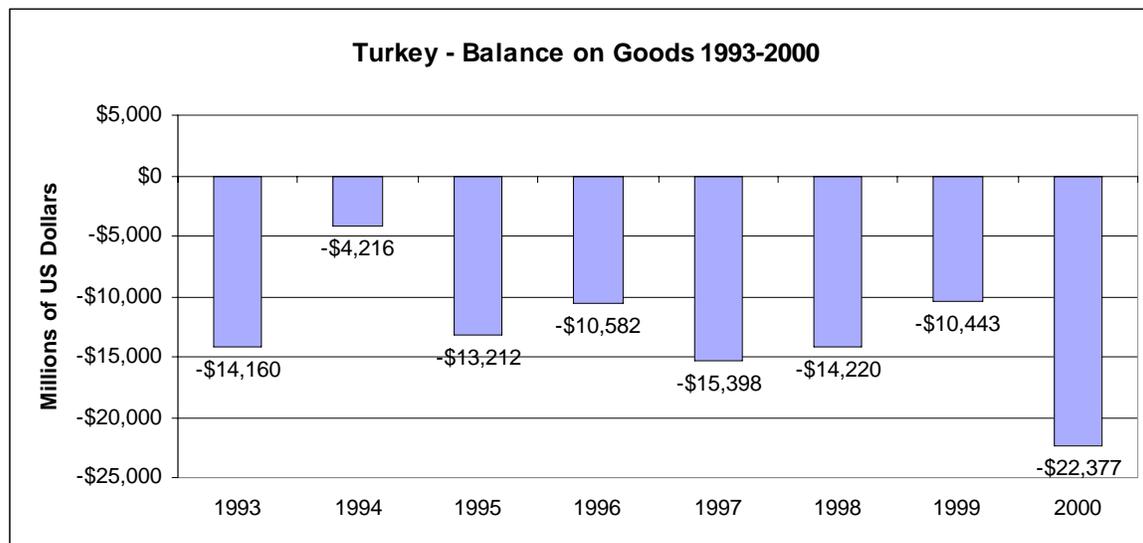
### Macroeconomic Issues:

#### Jordan

As indicated earlier, Jordan's economy has experienced consistent growth over the past decade with the largest gains being in the industrial and services sectors. Jordan is making efforts to increase growth in these areas through expanding trading arrangements with regional and out of region trading partners and embarking on ambitious plans to further develop the tourism sector.

#### Turkey

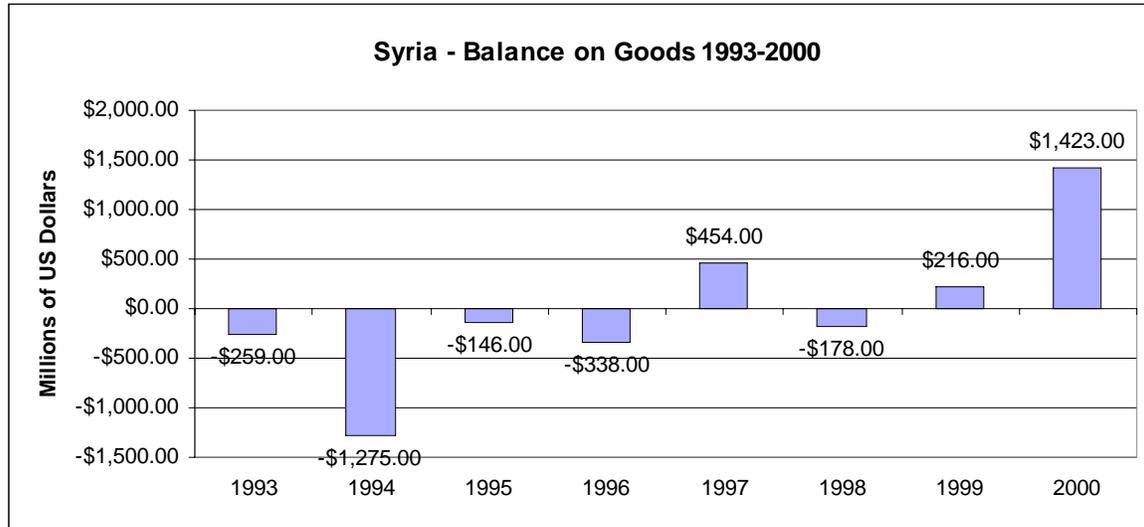
Turkey's economic performance in recent years has led to consistent balance of payments deficits. The following chart indicates that in goods alone, Turkey has run substantial deficits since 1993.



*Source:* Balance of Payments Statistics Yearbook 2001, IMF, Pg. 913.

## Syria

The following chart indicates that Syria's balance of payments position has improved in recent years with surpluses being posted on trade in goods. However, Syria's outstanding debt as of 2000 was over \$21.5 billion.<sup>50</sup>



*Source:* Balance of Payments Statistics Yearbook 2001, IMF, Pg. 875.

<sup>50</sup> *The World Bank, Global Development Finance Country Tables 2002, Washington, DC. Pg. 520.*

## COMMERCIAL BACKGROUND

The following section will present issues relevant to the construction of the Seyhan/Ceyhan pipeline and cost recovery. Information on the financial status of Jordan's water sector and alternatives to the pipeline are presented as well.

### **Pipeline Construction:**

The distance between the Seyhan/Ceyhan and Amman, Jordan is approximately 750 kilometers. In order to accurately assess the cost of building a pipeline that covers this distance and delivers the requisite amount of water to Amman, a comprehensive feasibility study would need to be conducted. A proper feasibility study falls outside the scope of this Master's Project as it is very cost and labor intensive. In the absence of such a study, cost estimates made throughout the remainder of this paper must not be taken as definitive figures. However, a proper feasibility study would take into consideration many factors such as the following;

- Route of the pipeline
- Changes in elevation
- Quantity of pipe needed
- Number of pumping stations needed
- Amount of electricity needed to operate pumping stations
- Long Run Operation and Maintenance Costs (O&M)
- Labor Costs
- Security factors

In order to meet Jordan's water deficit of 360 MCM in 2020, a pipeline with a capacity of roughly 1 MCM per day would be needed. Based on rough estimates, a single pipeline capable of carrying this amount of water would need to be about 2.4 meters in diameter (96 inches). An alternative is to construct a series of smaller pipelines each with a somewhat smaller capacity. Cost estimates will be analyzed in the section on Commercial Analysis, however it is safe to assume that a project of this magnitude will cost a minimum of hundreds of millions of dollars. It is reasonable to expect that the pipeline would take about five years to build and would have a life expectancy of 80-100 years.

There are several international construction companies that would likely show an interest in conducting a feasibility study for a pipeline project of this type with the eventual hope of gaining the contract to build it. Companies such as Bechtel, Haliburton, Harza, and CM2Hill, and Dong Ah would likely be interested in the project.

### **Funding:**

Funds to build the pipeline could be provided from several sources. The most likely candidate for offering a loan for this project would be the World Bank. Other potential

donors include the Arab Development Bank, the Islamic Development Bank, the National Bank of Abu Dhabi and Barclay's Bank.

### **Capital Costs:**

Capital expenditures will cover three broad areas. These will each be explored in the section on Commercial Analysis:

- Pipe
- Dams or other structures to form a catchment area for the water
- Pumping Stations
- Labor

### **Operation and Maintenance Costs:**

Operating and maintenance costs (O&M) are based upon several factors including the following which will be explored in the section on Commercial Analysis:

- Amortized loan payments to lenders who finance pipeline construction
- Electricity needed to run pumping stations
- Maintenance costs
- The cost of water from Turkey

### **Unit Costs for Water:**

Cost competitiveness of the pipeline compared to alternatives is the largest factor in determining its commercial feasibility. The decision to pursue the construction of a pipeline will have the greatest chance of success if the water it ultimately delivers is cost competitive or cheaper than alternatives. Alternatives include desalination, the delivery of freshwater by tankership, and the delivery of freshwater by waterbag. These alternatives will be explored in the section on Commercial Analysis.

### **The Peace Pipeline:**

In 1987 a series of pipelines were proposed to transport Turkish water to its southern neighbors. The plan, dubbed the "Peace Pipeline" involved the construction of two pipelines originating near the Seyhan and Ceyhan Rivers whose combined average annual flow is 15.19 billion cubic meters. A portion of this water is utilized along the course of the rivers while the rest drains into the Mediterranean Sea.<sup>51</sup> The original Peace Pipeline was to originate at the Seyhan and Ceyhan Rivers and consist of a 6,550 km dual-line system with a capacity of 6 million cubic meters/day at a cost of roughly \$21

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<sup>51</sup> Mehmet Tomanbay, "Turkey's Approach to Utilization of the Euphrates and Tigris Rivers", *Middle East Quarterly* Volume 22, Number 2, Spring 2000. Pg. 85. Actual data from State Hydraulic Works, *Turkey's Hydroelectric Energy Potential and Current Situation*, Ankara 1998.

billion.<sup>52</sup> It would have been one of the most expensive trans-boundary projects in the world.

This massive network was to extend from southern Turkey to Syria where it would split into western and eastern branches. The western branch would deliver water to cities in Syria, Jordan and western Saudi Arabia while the eastern branch would serve eastern Saudi Arabia, Kuwait, Bahrain, Qatar, the United Arab Emirates, and Oman.<sup>53</sup> While technically feasible, this project never made it out of the planning stages.

As mentioned, the distance between the Seyhan and Ceyhan Rivers in Turkey and Amman, Jordan is approximately 750 kilometers. Estimates for construction of the original Turkey to Jordan section of the original Peace Pipeline have been loosely cited at between \$1 and \$5 billion. It would have cost an estimated \$3.2 million per kilometer to build the entire Peace Pipeline. This figure is determined by dividing the total estimated cost of the pipeline (\$21 billion) by the total distance of the pipeline (6,550 kilometers). As there is limited information on how this figure was originally arrived at I can only assume that it included, in addition to the pipe, necessary elements such as dams and pumping stations. A more in depth cost analysis for the proposed Seyhan/Ceyhan pipeline will be detailed in the Commercial Analysis section of this paper.

### **The Cost of Turkish Water:**

Israel and Turkey recently entered into a 20 year agreement in which Turkey will sell Israel 50 MCM/year of freshwater from the Manavgat River in southern Turkey. This water will likely be delivered by seagoing tankerships. Although the price per cubic meter has not been finalized, it has been reported that Turkey will sell water to Israel for somewhere between \$0.18 and \$0.23 per cubic meter. However, some reports indicate that Turkey may offer to sell water for as low as \$0.05 to \$0.10 per cubic meter.<sup>54</sup>

### **Alternatives to the Pipeline:**

There are several possible alternatives to the Seyhan/Ceyhan pipeline including delivering water by bag, tankership, or desalinating saltwater. All of these alternatives are effective and used in one form or another in different parts of the world. Each alternative will be analyzed in the following section on Commercial Analysis.

### **Recovering Costs:**

The Jordanian government, specifically the Water Authority of Jordan (WAJ), must collect the requisite amount of money each year to pay for pipeline costs. These funds

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<sup>52</sup> United Nations University, "Managing Water for Peace in the Middle East", [www.unu.edu/unupress/unupbooks/80858e/80858E04.htm](http://www.unu.edu/unupress/unupbooks/80858e/80858E04.htm)

<sup>53</sup> Mostafa Dolatyar and Tim S. Gray, *Water Politics in the Middle East*. (USA, St. Martin's Press, Inc. New York, 2000). Pg. 195.

<sup>54</sup> Amiran Cohen, "Lieberman backs plan to import Turkish water", *Ha'aretz*, May 31, 2002 and "The water issue between Turkey and Israel", *Arabic News.Com*, [www.arabicnews.com](http://www.arabicnews.com).

are most likely to be generated in the form of fees generated by the users of pipeline water in the industrial, hotel, and residential sectors. The WAJ currently does not collect all of the tariffs it charges its customers. This is partly due to a weak collection mechanism as well as an unwillingness of Jordanians to pay their water bills.

Additionally, anecdotal evidence suggests that some wealthier Jordanians who are responsible for large water consumption (i.e. for filling swimming pools and watering lawns) usually are the most politically connected and are able to avoid paying for water.

Additionally, The Jordan Valley Authority, which is responsible for managing the water resources in the highly agricultural region of the Jordan Valley, does not collect enough revenue to cover costs. If water from the Seyhan/Ceyhan Pipeline is used in the agriculture sector, cost recovery will be an even more challenging issue as water is currently delivered far below cost to farmers in Jordan and in some cases for free. In order to make the pipeline cost effective, the WAJ will need to implement an enforceable cost recovery mechanism that can consistently generate stable revenues.

### **World Bank Water Survey:**

In 1995 the World Bank conducted a limited survey of water consumers in the Amman area in order to gather data on consumers perceptions and attitudes concerning water use. The results of this survey indicated the following;<sup>55</sup>

- Every household polled in the survey had at least one roof tank to collect water for use when it was not being pumped from the city. This allowed for *de facto* 24 hour water service.
- 35-45% of households surveyed had a good idea of how much water they used per day.
- A high percentage of water consumers were ware of Amman's water shortage and over 70% of those polled could describe a T.V. advertisement about conserving water.
- Over 80% of those polled remembered how much their previous water bill was.
- The three areas that consumers singled out for improvement in water service were "Cleaner Water", "24 hour service", and "Lower Price".
- A significant portion of consumers supplement their water consumption with the purchase of more expensive bottled water.

The significance of these results is important in understanding the potential for revenue collection on water services in Jordan. The results of the survey and their implications will be discussed in the section on Commercial Analysis.

### **Continued Deficits:**

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<sup>55</sup> The World Bank, *The Hashemite Kingdom of Jordan Water Sector Review, Vol. II, Annexes C-N, October 15, 1997. Annex K. Pg. 1-2.*

Despite efforts currently being made by Jordan with the help of the World Bank to recover costs, the following chart indicates shortfalls between operating costs and revenues within the WAJ as they were projected by the World Bank in 1999.

**Income Statement for the Water Authority of Jordan 1994 – 2004  
(Figures in USD)**

Year	Actual Audited Data			Estimate
	1994	1995	1996	1997
<b>Revenues</b>	68,153	69,057	78,426	96,385
<b>Expenses</b>	152,009	168,987	165,745	191,469
<b>Net Income</b>	(83,856)	(99,930)	(87,319)	(95,084)
<b>Total Deficit</b>	(476,048)	(575,637)	(663,245)	(758,329)

Year	Projections					
	1998	1999	2000	2001	2002	2003
<b>Revenues</b>	113,949	123,014	136,665	147,064	180,820	233,050
<b>Expenses</b>	198,429	207,414	213,598	221,360	251,573	295,960
<b>Net Income</b>	(84,480)	(84,400)	(76,933)	(74,296)	(70,753)	(62,910)
<b>Total Deficit</b>	(842,809)	(927,211)	(1,004,142)	(1,078,439)	(1,149,192)	(1,212,102)

*Source: The World Bank, Project Appraisal Document on a Proposed Loan in the Amount of US\$55.0 Million to the Hashemite Kingdom of Jordan for an Amman Water and Sanitation Management Project, February 17, 1999. Annex 5, Pg. 44.*

The current fee structure in Jordan is shown in the following chart. Tariffs in the industrial sector are fairly stable at about \$2.00 per cubic meter, \$1.40 in the hotel sector, and graduated in the residential sector based on consumption. The weighted average water tariff in Amman according to a 1999 World Bank report was \$0.623 per cubic meter and the weighted average sewerage surcharge was \$0.242 per cubic meter making the average cost of water \$0.87 per cubic meter in the residential sector.<sup>56</sup>

### Water Tariffs in Jordan by Sector

<sup>56</sup> The World Bank, *Project Appraisal Document on a Proposed Loan in the Amount of U.S.\$55.0 Million to the Hashemite Kingdom of Jordan for an Amman Water and Sanitation Project, February 17, 1999.* Annex 5, Pg. 43.

<b>Sector</b>	<b>Tariff (\$ per meter<sup>3</sup>)</b>
<b>Industry<sup>57</sup></b>	\$2.00
Within Qualifying Industrial Zone <sup>58</sup>	\$2.10
<b>Hotels<sup>59</sup></b>	\$1.40
<b>Residential<sup>60</sup>(meter<sup>3</sup>)</b>	<b>Greater Amman (\$ per meter<sup>3</sup>)</b>
1-20	\$2.84 (total)
21-40	\$0.20
41-50	\$0.25
51-60	\$0.34
61-70	\$0.44
71-80	\$0.53
81-90	\$0.62
91-100	\$0.72
101-150	\$0.95
151-200	\$1.21
>201	\$1.21
<b>Jordan Valley Agriculture<sup>61</sup>(meter<sup>3</sup>)</b>	<b>Tariff (\$ per meter<sup>3</sup>)</b>
0-1000	\$0.0114
1001-2000	\$0.0171
2001-3000	\$0.0286
3001 +	\$0.0500

<sup>57</sup> This figure is based on published rate per cubic meter according to the Central Bank of Jordan, <http://www.jordaninvestment.com/resource-data.htm>

<sup>58</sup> This figure is based on published rate per cubic meter in Qualifying Industrial Zones, [www.jordaninvest.com/5a.htm](http://www.jordaninvest.com/5a.htm)

<sup>59</sup> Radwan A. Al-Weshah, "Optimal Use of Irrigation Water in the Jordan Valley: A Case Study". (Netherlands, Kluwer Academic Publishers, 2001). Pg. 337.

<sup>60</sup> Jordanian Ministry of Water and Irrigation.

<sup>61</sup> Jordan Valley Authority, 2002.

## STAKEHOLDERS

The following section will present the major stakeholders that are relevant to the implementation of the Seyhan/Ceyhan pipeline in Jordan, Syria and Turkey. A background description of each stakeholder is provided.

### Jordan

#### **Type of Government:**

Jordan is a constitutional monarchy.

#### **Executive:**

King Abdullah II is the executive authority in Jordan.

#### **Prime Minister:**

The Prime Minister is appointed by the king and is the head of the government.

#### **Cabinet:**

The Prime Minister's Cabinet consists of the Council of Minister's. Members of the Council are appointed by the prime minister in consultation with the king.

#### **Legislative:**

Jordan has a bicameral legislature consisting of the House of Notables (Senate), whose members are appointed, and the House of Deputies (House of Representatives), whose members are elected.

**Jordan Ministry of Industry and Trade:** The Ministry of Industry and Trade is responsible for regulating domestic economic activities concerning Jordanian and foreign companies, managing foreign trade policy and agreements, ensuring compliance with intellectual property laws, and maintaining numerous domestic economic programs and national economic statistics.

**Jordan Ministry of Finance:** The Ministry of Finance is responsible for Jordan's fiscal and monetary policy including revenue collection, banking and the repayment of local and international loans.<sup>62</sup> The Ministry is responsible for overseeing the allocation of water sector budgets, collecting sewerage taxes, and is involved in financing projects in the water sector.<sup>63</sup>

Jordan's financial situation has fluctuated over the past decade with negative trade balances and mounting debt. Jordan relies on significant amounts of foreign aid and remittances from workers living abroad, particularly in the Persian Gulf. The government's financial situation is often negatively affected by regional political events such as the current war between the U.S. and Iraq.

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<sup>62</sup> The World Bank, *The Hashemite Kingdom of Jordan Water Sector Review, Vol. II, Annexes C-N, October 15, 1997*. Annex G, Pg. 1.

<sup>63</sup> Ibid.

**Jordan Ministry of Foreign Affairs:** The Ministry of Foreign Affairs is responsible for Jordan's external relations. Jordan has diplomatic representation with both Turkey and Syria. The current administration has made specific efforts to bring Jordan closer to Syria through economic and trade related measures.

**Ministry of Water and Irrigation:** The Ministry of Water and Irrigation is responsible for Jordan's water policies throughout the country. The Ministry monitors sources of water within Jordan such as the Jordan and Yarmouk Rivers, the Disi Aquifer as well as numerous underground water basins. Jordan's long-term water policy is formulated within the Ministry and it is widely held that Jordan's water crisis could negatively impact the economy as a whole if a solution is not found in the near term.

**Water Authority of Jordan:** The Water Authority of Jordan (WAJ) is responsible for managing municipal water operations and is under the supervision of the Ministry of Water and Irrigation. The WAJ distributes water in the greater Amman area, maintains the existing distribution system, and carries out services such as metering and tariff collection. The WAJ has operates at a financial loss and its long-term debt is increasing annually.

In 1999 Jordan acquired a World Bank loan in the amount of \$55 million to renovate the municipal water supply system in Jordan and privatize many of the operations under the authority of the WAJ. Privatization efforts are being managed by the French water company Suez.

**Jordan Valley Authority:** The Jordan Valley Authority (JVA) is responsible for water policies in the Jordan Valley which accounts for roughly 70% of Jordan's total agricultural water use. The JVA currently operates at a loss and is reported to be overstaffed and inefficient.

**Ministry of Planning:** The Ministry of Planning coordinates donor and international financing agencies. The Ministry reviews projects, proposals and feasibility studies and acts as a liaison between the Ministry of Water and Irrigation and its two sub-authorities, the Water Authority of Jordan and the Jordan Valley Authority.<sup>64</sup>

**Ministry of Tourism:** The Ministry of Tourism coordinates policy related to Jordan's many historical tourism sites throughout the country. Tourism receipts are a major source of revenue for Jordan and this sector is expected to dramatically grow in the event of a comprehensive regional peace. Plans are in place to build thousands of new hotel rooms and numerous resorts throughout Jordan.

**Ministry of Agriculture:** The Ministry of Agriculture is responsible for overseeing agricultural production and irrigation policies in Jordan. The majority of Jordan's

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<sup>64</sup> The World Bank, *The Hashemite Kingdom of Jordan Water Sector Review, Vol. II, Annexes C-N, October 15, 1997*. Annex G, Pg. 1.

agricultural production is focused in northern Jordan which includes the Jordan Valley. Agriculture accounted for just 2.2% of Jordanian GDP in 2000.

**Farmers:** Although the agriculture sector has been decreasing in terms of annual monetary value, farmers make up a solid source of support for the ruling family and meeting the needs of the agriculture sector is an important political goal. Water allocations to farmers are expected to level off at about 890 MCM per year, an increasing proportion of which will be provided through recycled wastewater in coming years. The Jordanian Government is implementing water saving farming techniques as a result of the country's ongoing water problems.

**The Public (Water Consumers):** The public is the largest water constituency in the country and includes people from all social classes and occupations. In the greater Amman area, where the majority of Jordanian's live, water is delivered just once a week and its quality is often substandard. Many Jordanian's maintain large storage tanks on the top of their houses to store water for use on days when water is not pumped to households. As Jordan's water crisis worsens so will the quality of water as saltwater seeps into groundwater basins and soil is polluted from excessive quantities of recycled wastewater that has not been properly treated. The public's lack of payment for current water service is likely a result of the quality of water they are receiving and the frequency with which they receive it.

**The Business Sector:** Business and industry representatives clearly see the implications that a lack of freshwater will have on their lives. Without adequate water manufacturing processes cannot be carried out and water intensive machinery is often corroded by dirty water or water with high mineral content. Tariffs on water in the business and industry sector are the highest in the country (\$2.00 per meter<sup>3</sup>) with tariffs in Jordan's Qualified Industrial Zones even higher (\$2.10 per meter<sup>3</sup>). Representatives in this sector should explain to their government that their willingness to pay for water is based on a clean, reliable supply.

**Tourism Sector:** Jordan's economy relies in part on a large hotel and tourism sector which contributes roughly 11% of GDP. Over the past decade, Jordan has been substantially developing its tourism infrastructure, particularly around historical sites and the Dead Sea. Regional stability is the key to growth in this sector and there are great expectations that if a comprehensive, regional peace agreement is reached Jordan will reap tremendous financial benefits. The number of hotel rooms in Jordan has increased from 12,100 in 1997 to 16,800 in 2000.<sup>65</sup> There are plans to build an additional 15,000 hotel rooms in the Dead Sea region in the near future.<sup>66</sup> Occupancy levels have been increasing dramatically as the number of occupancies went from 2.25 million in 1998 to 2.5 million in 1999, and there are expectations that this figure will reach 3.6 million in 2003 depending on the regional political situation.<sup>67</sup> Hotel and restaurant owners realize

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<sup>65</sup> Jordan Projects for Tourism Development, <http://www.jptd.com.jo/aboutus.htm>

<sup>66</sup> "The Dead Sea, Ancient Treasure, 21<sup>st</sup> Century Opportunity", Jordanian Ministry of Water and Irrigation and Ministry of Planning, 2002. Pg. 7.

<sup>67</sup> Jordan Projects for Tourism Development, <http://www.jptd.com.jo/aboutus.htm>

that the success of their businesses is dependent on two main things, water and regional security. While regional security is beyond their control, they can have a significant impact on decisions the Jordanian government takes regarding efforts to increase Jordan's water supply.

## Syria

### **Type of Government:**

Syria is a constitutional republic.

**President:** Syria's president is Dr. Bashar Al-Assad.

**Vice President:** Syria currently has two Vice Presidents, both of whom are appointed by the president.

### **Prime Minister:**

The head of the Syrian Government is the Prime Minister along with three deputies appointed by the president.<sup>68</sup>

### **Cabinet:**

The Council of Ministers is appointed by the president.

**Ministry of Foreign Affairs:** The Ministry of Foreign Affairs is responsible for Syria's external relations. Syria has diplomatic representation with both Turkey and Syria. The current administration has made specific efforts to bring Syria closer to both Turkey and Jordan through economic, military, and trade related measures.

**Ministry of Economy & Foreign Trade:** The Ministry of Economy and Foreign Trade in Syria is responsible for helping to develop Syria's economic policy, negotiating trade agreements with foreign countries, preparing domestic legislation pertaining to foreign trade, overseeing the country's banking system, developing investment regulations, managing procedures for import and export, establishing trade centers and commercial representation offices that promote Syrian goods abroad.<sup>69</sup> The minister is a member of the president's cabinet, the Council of Ministers.<sup>70</sup>

**Ministry of Agriculture:** The Ministry of Agriculture is responsible for Syria's agricultural development, a large portion of which is dependent on water obtained from the Euphrates River. In conjunction with the Ministry of Irrigation, Syria has carried out large projects in the past two decades to increase the total amount of agricultural land in Syria, however, due Turkey's limiting water on the Euphrates has hindered this development to a degree. Therefore, agricultural expansion has not been carried out as expected.

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<sup>68</sup> CIA Factbook, 2002. Pg. 498.

<sup>69</sup> Syrian Ministry of Economy and Foreign Trade, [www.syrecon.org/main\\_frame.html](http://www.syrecon.org/main_frame.html)

<sup>70</sup> Ibid.

**Ministry of Irrigation:** The Ministry of Irrigation is responsible for issues related to Syria's water supply as it relates to the agriculture sector of the economy. Syria has embarked on massive irrigation projects over the past two decades, however, a lack of water from Turkey and problems with existing projects have limited the country's ability to carry out irrigation plans and agricultural expansion as expected.

**Ministry of Electricity:** The Ministry of Electricity is responsible for Syria's energy policies and needs. Syria has both traditional and hydroelectric power capabilities.

**Ministry of Finance:** The Ministry of Finance is responsible for Syria's fiscal and monetary policy including revenue collection and banking. Syria's financial situation has remained stagnant over the past decade with mounting debt and a reduction in aid from Gulf countries.<sup>71</sup>

**Mayors of Damascus and Aleppo:** The cities of Damascus and Aleppo are experiencing water shortages and problems with providing clean water to their customers. The mayors of these major cities might be interested in benefiting from the water of the Seyhan/Ceyhan pipeline for domestic and industrial consumption.

## Turkey

### **Type of Government:**

Turkey is a constitutional republic.

**President:** The current President of Turkey is Ahmed Necdet Sezer

**Prime Minister:** The Prime Minister is the head of the government. The Prime Minister and Deputy Prime Ministers are appointed by the president.

**Council of Ministers:** Ministers are appointed by the president on the nomination of the president.

**Ministry of Foreign Affairs:** The Ministry of Foreign Affairs is responsible for Turkey's external relations. Turkey has diplomatic representation with both Syria and Jordan. The current administration has made specific efforts to improve relations with Syria through military and water related measures.

**Ministry of Industry and Trade:** The Ministry of Industry and Trade in Turkey is responsible for Turkey's industrial and trade policy, negotiating trade agreements with foreign countries, preparing domestic legislation pertaining to foreign trade, and implementing trade policy.

**Ministry of Water and Irrigation:** The Ministry of Water and Irrigation is responsible for Turkey's extensive water policies related to the country's numerous rivers, lakes, and

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<sup>71</sup> Department of State, *Background Notes - Syria*, February 2002.

expanding agricultural areas. The Ministry plays an integral role in the GAP project in eastern Turkey.

**Ministry of Agriculture:** The Ministry of Agriculture is responsible for Turkey's agriculture policies and is playing an active role in the development of eastern Turkey through the GAP project. The GAP will create substantial new amounts of arable land in coming years and expected economic growth in this part of the country.

**Farmers:** Through the GAP project Turkey will increase the amount of agriculture lands available in southeast Turkey. Farmers may feel threatened if a deal is reached between Syria and Turkey allowing additional water to flow out of Turkey via the Euphrates in exchange for allowing the pipeline to traverse Syria.

**Ministry of Finance:** The Ministry of Finance is responsible for Turkey's fiscal and monetary policy including revenue collection and banking. Turkey's financial situation has been difficult over the past decade with large trade deficits and rising inflation.

**Locals in the Seyhan/Ceyhan River Region:** Local communities will be affected in the area where the catchment basin for the mouth of the pipeline will be built. The effects of the pipeline could range from negative environmental impacts to the positive creation of jobs, both short and long-term, for those living in the area.

### International

**The World Bank:** The World Bank is a major financial lender to developing countries for projects related to economic and social development and raising standards of living. Jordan has been the recipient of World Bank loans in the past and Jordan would likely solicit the World Bank for funds to build the Seyhan/Ceyhan pipeline.

**Other Lending Institutions:** Other lending institutions such as the Arab Fund for Social and Economic Development (Kuwait), the Islamic development Bank (Saudi Arabia), the National Bank of Abu Dhabi, and Barclay's Bank (UK) have all been active in funding development projects in the Middle East, including activities in the water sector. These institutions may be approached for funding if the World Bank is unable, or unwilling to fund the construction of the Seyhan/Ceyhan pipeline.

**International Construction Companies:** The following construction companies have divisions that do major pipeline projects and they would likely be interested in conducting initial feasibility studies on the Seyhan/Ceyhan pipeline; Bechtel (USA), Halliburton/Brown&Root (USA), Harza Engineering (USA), CH2M HILL (USA), Dong Ah (South Korea)

**Suez Water Management:** This French water management company is currently managing Amman's municipal water system per a contract gained through a World Bank loan to the Jordanian Government for the reconstruction and management of Amman's water system.



## **POLICY BACKGROUND**

The following section will present background on policy issues that will need to be considered by Jordan, Syria and Turkey in order to assess whether or not the Seyhan/Ceyhan pipeline should be pursued. Policy issues are separated by country.

### **Policy Issues:**

There are several policy issues that Jordan, Turkey and Syria must address if the Seyhan/Ceyhan pipeline is to become a reality. This section will present those issues and background related to them.

### **Jordan**

**Policy Issue:** Should Jordan pursue a policy of acquiring water from outside its borders? This raises two subsequent issues; dependence on a foreign source for water, and the security of the pipeline so as to ensure the delivery of water.

**Policy Issue:** Should Jordan allocate a portion of the water gained from the Seyhan/Ceyhan pipeline to the agriculture sector?

**Policy Issue:** How can Jordan recover costs on water delivered from the Seyhan/Ceyhan pipeline in order to make it financially viable?

### **Turkey**

**Policy Issue:** Should Turkey construct facilities on the Seyhan and Ceyhan Rivers to support a pipeline that may cause environmental and political consequences at home?

### **Syria**

**Policy Issue:** Should Syria host the Seyhan/Ceyhan pipeline given its current dispute with Turkey over the Euphrates River and the potential environmental and social impacts the pipeline could cause at home?

**Policy Issue:** If the Seyhan/Ceyhan pipeline is built, should Syria seek to acquire some of its water for use in Aleppo and Damascus?

### **Background on Policy Issues Facing Jordan:**

According to Water Minister Hazem Nasser, Jordan is designing its national industrial strategy around water and its availability. He has pointed out that increasing investment in Jordan and industrial projects have contributed to Jordan's water crisis. It is feared that a lack of water and its high cost could discourage future investors.<sup>72</sup> Despite this

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<sup>72</sup> *Jordan Times*, November 27, 2002.

forward thinking, Jordan does not have a long-term plan to increase its freshwater resources to eliminate its growing water deficits. To meet its water needs Jordan can pursue a policy of further drawing down non-renewable water supplies such as the Disi Aquifer, desalinating water in Aqaba, or pursuing the Red-Dead canal. Whatever policy Jordan pursues, the result must be the supply of roughly 360 MCM of water per year in 2020 and beyond.

Cost recovery for water services are currently a major issue for Jordan as its main water authorities, the Water Authority of Jordan and the Jordan Valley Authority, are currently operating at losses. Cost recovery will be an even more important issue for Jordan if it decides to proceed with the Seyhan/Ceyhan pipeline or any of the competing alternatives. Costs must be recovered in order to repay creditors for pipeline construction and to keep the project viable in the long-term.

Pipeline security will be an important element to factor into the operation of the Seyhan/Ceyhan pipeline. Threats include terrorism as well as individuals compromising the pipeline for personal use.

#### **Background on Policy Issues Facing Turkey:**

It is clear that Turkey is willing to sell its excess water. Water shipments to Turkey's neighbors and the recent water deal with Israel are evidence that Turkey has made it a goal to obtain revenue through the sale of excess water. Both environmental and social effects of the Seyhan/Ceyhan pipeline on the communities surrounding it must be considered as these may have an impact on the government's ability to proceed with the project. Additionally, lenders such as the World Bank will require some type of an environmental impact study prior to disbursing funds.

In order for Turkey to implement plans for the Seyhan/Ceyhan pipeline, it would likely have to come to some type of comprehensive agreement with Syria on the use of Euphrates River water. The details of the most recent agreement regarding the Euphrates, reportedly signed between the two sides in 2001, have not been disclosed to the public.

#### **Background on Policy Issues Facing Syria:**

Syria's willingness to host a pipeline is likely contingent upon its relationship with Turkey. Since 1999 that relationship has improved to the point where both parties, as mentioned, reached some type of agreement on the issue in 2001.

The Seyhan/Ceyhan pipeline could have negative environmental as well as social impacts. The opposite is also true as the pipeline could be built in an environmentally sensitive manner and provide numerous jobs for Syrians in the short and long-term. Additionally, the water situations in Aleppo and Damascus have worsened in recent years with water being rationed in Damascus and delivered on a strict schedule. Policy makers

must take these issues into consideration when evaluating the merits of the Seyhan/Ceyhan pipeline.

### **POLITICAL BACKGROUND**

The following section will present the major political issues facing Jordan, Syria and Turkey regarding the Seyhan/Ceyhan pipeline. This section will present key points in the relationships between the three countries that will be a factor in determining the political feasibility of the pipeline.

#### **Jordan**

##### **Jordan's Search for Freshwater:**

Jordan has considered Turkey a potential source of freshwater since 1987 when the idea of the "peace pipeline" was first proposed. But as Jordan is isolated geographically and landlocked, with the exception of a small outlet to the Red Sea in the south, a long-term solution to Jordan's water problem will only be realized if either Israel or Syria agrees to act as a conduit for the transport of bulk water. Jordan has considered the possibility of receiving large quantities of water, either desalinated or from tankerships, via a pipeline transiting Israel or by tanker trucks, but no plans are currently being implemented to make this a reality.

In January 2000, Jordan's Water and Irrigation Minister, Kamel Mahdin, met with Turkish officials about obtaining 180 million cubic meters of Turkish water over the following two years. During his visit, the Minister expressed his interest in importing Turkish water and that the issue of bulk water imports would be on King Abdullah's agenda when he visited later that Spring.<sup>73</sup> Just days later, King Abdullah arrived in Turkey where he raised the water issue in an address to the Turkish parliament.<sup>74</sup>

##### **Jordan and Israel's Hydro-relationship:**

The Jordan-Israel Peace Treaty of 1994 includes a water sharing provision based on seasonal flows of the Jordan and Yarmouk Rivers. Both sides also committed to finding an additional 50 MCM/year of drinkable water for Jordan, possibly through desalination or the diversion of water from another source within Israel.<sup>75</sup>

##### **Jordan and Syria Relations:**

Cooperation between Jordan and Syria is crucial to the success of the pipeline. Until recently, relations between the two countries were strained, in large part due to Syria's anger at Jordan for signing the 1994 peace treaty with Israel. Since the death of Jordan's King Hussein in 1999 relations began to improve and they were given a further boost with the death of President Hafez Al-Assad of Syria in 2000 and the accession of the

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<sup>73</sup> "Talks by Jordan irrigation minister in Ankara concerning water", 18 January 2000.

[www.arabicnews.com](http://www.arabicnews.com).

<sup>74</sup> "Jordan intends to purchase shares of Turkish water", 22 January 2000. [www.arabicnews.com](http://www.arabicnews.com).

<sup>75</sup> Jordan-Israel Peace treaty, October 26, 1994, Article 6: Water.

young Bashar Al-Assad to the presidency. A free trade agreement between the two countries was signed in 2001 and cooperation has resulted in plans to construct the Al-Wihdeh Dam (“Unity Dam”) on the shared Yarmouk River. Additionally, in recent years King Hussein has permitted the circulation of Syrian newspapers within the country that were previously not allowed.

## Turkey

### **Turkey as the Regional “Hydro-Power”:**

Turkey controls the Seyhan and Ceyhan Rivers which would serve as the source of the pipeline’s freshwater. Turkey has an abundance of freshwater from its numerous streams and rivers. The headwaters of both the Tigris and Euphrates Rivers originate in Turkey and the country is considered by some to be an emerging regional “hydro-power”. Turkey has offered to sell excess water from its numerous rivers to needy neighbors since the mid-1980’s. Turkey currently ships about 6.8 MCM/year of freshwater to Turkish controlled Northern Cyprus via tanker ships and waterbags.<sup>76</sup>

The now completed water export facility on the Manavgat River allows Turkey to offer its water for export in bulk. Israel recently signed a deal with Turkey to supply it with 50MCM/year of Manavgat water for the next 20 years.<sup>77</sup> Coupled with the water deal was Turkey’s decision to purchase an undisclosed number of tanks and air force technology from Israel.<sup>78</sup>

As previously mentioned, the idea of a freshwater pipeline from Turkey was first proposed in 1987 by the Turkish Prime Minister, and future President of Turkey, Turgut Ozal.<sup>79</sup> The proposed “peace pipeline” would have supplied Middle Eastern countries with freshwater taken from Turkey’s annual runoff of the Seyhan and Ceyhan Rivers that drain into the Mediterranean Sea. Critics of Ozal’s proposal claimed that the peace pipeline was a public relations ploy to counter the negative attention Turkey received due to its decision to go forward with the Southeast Anatolia Project (GAP) in order to meet the agricultural and municipal water needs of southeast Turkey.<sup>80</sup> When complete, the GAP project is expected to consist of 13 major projects, seven in the Euphrates sub-basin and six in the Tigris sub-basin at a cost of over \$30 billion.<sup>81</sup> Included are plans for 22 dams and 19 hydroelectric plants that may reduce the flow of the Euphrates as much as 40% to Syria, and subsequently, 80% to Iraq.<sup>82</sup>

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<sup>76</sup> “Turkey thirsts to export excess water; Mideast: Sales to other countries in the parched region could boost its power as well as income”, *The Los Angeles Times*, 6 August 2000.

<sup>77</sup> “Israel-Turkey strike 20-year water deal”, *Associated Press*, 7 August 2002.

<sup>78</sup> Ibid.

<sup>79</sup> Daniel Hillel, *Rivers of Eden*, (USA, Oxford University Press, Inc. New York, 1994). Pg. 245-246.

<sup>80</sup> Ibid, 246.

<sup>81</sup> Arun P. Elhance, *Hydropolitics in the 3<sup>rd</sup> World*, (USA, United States Institute of Peace Press, Washington, DC, 1999). Pg. 149.

<sup>82</sup> Hussein A. Amery and Aaron T. Wolf, *Water in the Middle East, A Geography of Peace*, (USA, University of Texas Press, 2000). Pg. 220.

The Seyhan and Ceyhan Rivers are not included in the greater GAP scheme. These two rivers lie west of the area being developed under the GAP, and while a portion of their waters is utilized along the course of the rivers, a large quantity drains into the Mediterranean Sea.<sup>83</sup> The combined average annual flow of these two rivers is 15.19 billion cubic meters.

Ozal's party lost power after the 1991 elections and with it the momentum for the peace pipeline. The victor, Prime Minister Suleiman Demirel, distanced himself from the peace pipeline idea saying that such a scheme was "not in Turkey's best interest." The death of Ozal in early 1993 continued the loss of momentum for the peace pipeline, however, the idea was officially revived later that year by Turkey's new Prime Minister, Tansu Ciller, during a visit to the White House. In the end, while technically feasible, the peace pipeline was not seriously considered by potential beneficiaries due to its high cost, an estimated \$21 billion, and an unwillingness by potential downstream recipients to rely on Turkey for freshwater.

### Syria

Syria does not currently suffer from a lack of freshwater and relations between Syria and Turkey have been historically strained. Relations between the two have only improved in the past 2-3 years. The two countries share many differences, including the ongoing dispute over the waters of the Euphrates. Syria, along with Iraq, has been very skeptical and critical of Turkey's domestic water policy of restricting the flow of water on the Euphrates and Tigris Rivers. This dispute is one of the most visible, politically charged trans-boundary water conflicts in the world. Syria and Turkey are also engaged in a long-running territorial dispute over Turkey's Hatay province located in southern Turkey on Syria's northwest border.

The death of Hafez al-Assad in June of 2000 ushered in a new era in Syrian politics. Turkey's President, Ahmet Sezer, attended the funeral of Hafez al-Assad and at the ministerial level Syria began a series of meetings with Turkey on the issue of military security while continuing to express its anger over Turkey's handling of the Euphrates water issue. Meetings have since been held between the two countries respective ministers responsible for water and Syria has recently made a concerted effort to reach out to Turkey in a number of areas. An agreement on the allocation of Euphrates water was reached in 2001, however, as the details of this agreement were not made public, it can only be speculated as to whether or not the two sides reached a final or merely interim settlement on the Euphrates. Additionally, two historic military cooperation agreements were signed between Turkey and Syria in June 2002. The agreements allow both countries to exchange military students and engage in joint military exercises.<sup>84</sup> These issues are presented in detail in the section on Political Analysis.

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<sup>83</sup> Mehmet Tomanbaym, "Turkey's Approach to Utilization of the Euphrates and Tigris Rivers", *Middle East Quarterly*, Volume 22, Number 2, Spring 2000. Pg. 85. Actual data from State Hydraulic Works, *Turkey's Hydroelectric Energy Potential and Current Situation*, Ankara 1998.

<sup>84</sup> Nicholas Blanford, "Syria forms new alliances", *The Christian Science Monitor*, 26 June 2002.

## **POLITICAL BACKGROUND OF OTHER REGIONAL ACTORS**

### **Lebanon**

Lebanon is considered to be self sufficient in freshwater resources and the Seyhan/Ceyhan pipeline would not pass through Lebanese territory.<sup>85</sup> In the areas where Lebanon does have acute water shortages, such as in parts of Beirut and southern Lebanon, the lack of water is generally due to an undeveloped or damaged water infrastructure, not an overall lack of water. There is speculation that the Hasbani River in southern Lebanon, an upstream contributor to the Jordan River system, could be part of a pipeline or diversion system supplying Jordan with additional water. However, the annual capacity of the Hasbani is only estimated to be 130 MCM. In this case, even if the entire river were diverted to Jordan it would still only meet a fraction of Jordan's total expected water deficit in 2020. Furthermore, Israel would not support a complete diversion of the Hasbani to be carried out as it relies on the Hasbani's contribution to the greater Jordan River system from which it draws a substantial portion of its annual water.

### **Palestine**

Of all the riparians in the Jordan River Basin, Palestinians living under Israeli occupation are experiencing the greatest lack of freshwater. Annual per capita water use in the Palestinian Territories is among the lowest in the world at 93 cubic meters per person in the West Bank and 135 cubic meters per person in the Gaza Strip.<sup>86</sup> Both of these figures are well below the benchmark level of 1000 cubic meters per person annually in which water scarcity is considered to impede economic development and harm human health.<sup>87</sup>

The West Bank is situated on top of two aquifers, the Mountain Aquifer which is located between the west bank of the Jordan River and central Israel, and the Coastal Aquifer which extends nearly the entire coast of Israel from just south of Haifa down into the Gaza Strip.<sup>88</sup> Although the majority of the Occupied West Bank is situated above the Mountain Aquifer, Palestinian access to its waters is highly restricted due to restrictive Israeli policies in the Occupied Territories.

Since the 1967 war, the Israeli government has heavily restricted Palestinian water consumption through limiting access to water at its source. As a result, Israeli settlers have been the main beneficiaries of Israeli water policies in the Occupied Territories. It is estimated that in 1995 the 140,000 settlers living in the West Bank consumed about 50 MCM of water while the 1.2 million Palestinians living in the same area consumed 125

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<sup>85</sup> According to drawings of the original Peace pipeline proposed in 1987, the route bypassed Lebanon as well.

<sup>86</sup> Alwyn R. Rouyer, *Turning Water into Politics, The Water Issue in the Palestinian-Israeli Conflict*, (USA, Palgrave, New York, 2000). Pg. 25.

<sup>87</sup> Hussein A. Amery and Aaron T. Wolf, *Water in the Middle East – A Geography of Peace*, (USA, University of Texas Press, 2000). Pg. 51.

<sup>88</sup> Alwyn R. Rouyer, *Turning Water into Politics, The Water Issue in the Palestinian-Israeli Conflict*, (USA, Palgrave, New York, 2000). Pg. 22-23.

MCM. Higher living standards including lawns, swimming pools and highly subsidized access to water are large contributors to the disparity in use.

For Palestinian's, new well drilling is restricted as is the extraction, transfer, consumption and construction of water related facilities.<sup>89</sup> Although consumption levels among the Palestinians have been allowed to increase since 1967, they have not kept pace with population growth which has doubled during the more than 30 years of occupation.<sup>90</sup> Israel claims that its use of waters from the Mountain Aquifer under the West Bank is necessary to protect the water balance in Israel proper which relies heavily on the intrastate transfer of water from the Sea of Galilee, the reuse of wastewater, desalination, and bulk water transfers to meet its growing demand.

### Israel

Water is an issue of national security for Israel. Due to its arid climate, growing population and limited access to freshwater, Israel's water needs are expected to greatly increase in the coming years. Water was a component of Israeli territorial ambition prior to the founding of the nation in 1948 when plans called for Israel's northern border to extend at least to the Litani river in what is now southern Lebanon. In this case, the lower Litani, Wassani and Hasbani Rivers would have been incorporated into modern Israel. Water remains one of the main points of contention in negotiations with the Palestinian Authority and Syria as currently occupied land is home to a large percentage of Israel's annual freshwater.

Israel's current renewable water supply is about 1.7 MCM per year.<sup>91</sup> The use of treated wastewater and desalinated water bring Israel's total supply to roughly 2.1 billion MCM per year.<sup>92</sup> The distribution of Israel's water puts the nation at a distinct disadvantage as 80% of the water used in the country is located in the north while 65% of its agricultural land and largest cities are located in the south.<sup>93</sup> Annual per capita water consumption in Israel is estimated to be 350 cubic meters per person, similar to that of European countries.<sup>94</sup> Israel currently uses over 50% of its water in the agricultural sector.<sup>95</sup> This is not as much as Jordan or Syria, but it is still a significant figure given that the agriculture sector only accounts for about 4% of Israel's workforce and 3% of GDP.<sup>96</sup>

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<sup>89</sup> Alwyn R. Rouyer, *Turning Water into Politics, The Water Issue in the Palestinian-Israeli Conflict*, (USA, Palgrave, New York, 2000). Pg. 27.

<sup>90</sup> Ibid.

<sup>91</sup> Israel Water Commission estimates, 1998, [www.israel.org/mfa/go.asp?MFAHOOicO](http://www.israel.org/mfa/go.asp?MFAHOOicO).

<sup>92</sup> Ibid.

<sup>93</sup> Mostafa Dolatyar and Tim S. Gray, *Water Politics in the Middle East*, (USA, St. Martin's Press, Inc., New York, 2000). Pg. 91.

<sup>94</sup> Alwyn R. Rouyer, *Turning Water into Politics, The Water Issue in the Palestinian-Israeli Conflict*, (USA, Palgrave, New York, 2000). Pg. 28-29.

<sup>95</sup> Committee on Sustainable Water Supplies for the Middle East, *Water for the Future*, (USA, National Academy Press, 1999). Pg. 27.

<sup>96</sup> Ibid.

Water demand in Israel is currently equal to available supply only because sources of renewable water have been augmented, but demand is expected to increase substantially in the coming years. By 2020 total water demand in Israel is expected to be 2.68 MCM per year, nearly a billion cubic meters above renewable supply.<sup>97</sup> The gap between renewable water and demand will be made up through further utilization of recycled wastewater, increased desalination capacity, and bulk water imports from Turkey. In 2001, an Israeli official noted that “Israel needs 2 billion cubic meters of water annually. Of that, we need 100 to 200 million cubic meters to be imported.”<sup>98</sup>

Israel recently signed a deal with Turkey to supply it with 50 MCM/year of freshwater for each of the next 20 years.<sup>99</sup> This water will likely be supplied by tankerships, but talks have also included the idea of building a pipeline from Manavgat, Turkey (current site of Turkey’s multi-million dollar water export facility) to Israel by way of Northern Cyprus. Israel also plans to produce 200 MCM/year of freshwater by 2020 through desalination and is currently building a series of high-volume desalination plants to meet this target. One of the largest of these plants, being built in the coastal city of Ashdod at a cost of \$110 million, will desalinate about 50 MCM/year.<sup>100</sup> Once these plants are operational, each cubic meter of desalinated water is projected to cost between \$0.60 and \$0.65 to produce.<sup>101</sup>

Israel has refused to return the Golan Heights, which it took control of in 1969, to Syrian control partly due to the water resources located there. The most important of these is the Sea of Galilee which is the largest body of freshwater in Israeli controlled territory and provides Israel with a significant portion of its annual freshwater needs. Soon after Israel occupied the Golan Heights in 1967 it incorporated the waters of the Sea of Galilee into its National Water Carrier, a complex network of pipelines, waterways, diversion channels, and tunnels completed in 1964 to move water throughout Israel.<sup>102</sup> The National Water Carrier is such a large network that moving water throughout the system accounts for about 7% of the country’s annual electricity usage.<sup>103</sup>

Armed conflict has also been a part of the Israel-Syria water relationship. In 1966, just prior to the occupation of the Golan Heights, Syria attempted to divert 77% of the flow of the Hasbani and Baniyas Rivers (both of which make-up a significant portion of the headwaters of the Jordan River) to the detriment of Israel. Israel effectively stopped the construction of the diversion project by launching air strikes against heavy equipment

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<sup>97</sup> Israel Water Commission estimates, 1998, [www.israel.org/mfa/go.asp?MFAHOOicO](http://www.israel.org/mfa/go.asp?MFAHOOicO).

<sup>98</sup> Anthony C. LoBaido, “Israel plans water pipeline from Turkey”, *WorldNet Daily.com*, 2001.

<sup>99</sup> “Israel-Turkey strike 20-year water deal”, *Associated Press*, 7 August 2002.

<sup>100</sup> “Second Israeli desal plant approved”, *Global Water Intelligence*, January 2001, [www.globalwaterintel.com](http://www.globalwaterintel.com).

<sup>101</sup> Ibid.

<sup>102</sup> Mostafa Dolatyar and Tim S. Gray, *Water Politics in the Middle East*, (USA, St. Martin’s Press, Inc., New York, 2000). Pg. 105.

<sup>103</sup> Committee on Sustainable Water Supplies for the Middle East, *Water for the Future*, (USA, National Academy Press, 1999). Pg. 27.

that Syria had moved into the area.<sup>104</sup> The occupation of the Golan Heights the following year was important strategically due to both its proximity to Damascus and the presence of the waters of the Sea of Galilee.

In the Fall of 2002, Israel threatened to launch air strikes against a recently built Lebanese pumping station that diverts a portion of the Wazzani Springs water in southern Lebanon to local villages for drinking water.<sup>105</sup> The Wazzani Springs feed the Hasbani River, which is a primary source of water for the Jordan River and subsequently the Sea of Galilee.

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<sup>104</sup> Hussein A. Amery and Aaron T. Wolf, *Water in the Middle East – A Geography of Peace*, (USA, University of Texas Press, 2000). Pg. 156.

<sup>105</sup> Nicholas Blanford, “A Lebanese-Israeli water conflict threatens to boil over”, *The Christian Science Monitor*, 21 October 2002.

## LEGAL BACKGROUND

This section will introduce and analyze legal issues that are relevant to the Seyhan/Ceyhan Pipeline. It will address specific topics within the following bodies of law; commercial, international, and international trade.

### **Transboundary Water Pipelines and International Law:**

Water pipelines are unique in that they do not enjoy a specific status under international law as oil and gas pipelines do. While the regulation of oil and gas pipelines is managed by domestic law and unique legal instruments such as the 1994 Energy Charter Treaty (ECT), water pipelines do not have such status.<sup>106</sup> Therefore, the legal regime governing the operation of a transboundary water pipeline depends on specific provisions agreed to between participating parties.<sup>107</sup> In the case of the Seyhan/Ceyhan Pipeline, a legal regime must be built from the ground up.

The 1994 Energy Charter Treaty (ECT) entered into force in 1998 and is the only multilateral legal instrument providing a legal framework specifically for the transport of energy products and minerals in the international system.<sup>108</sup> Provisions in this treaty could be applicable in any legal framework governing the operation of the Seyhan/Ceyhan pipeline.

### **Transboundary Watercourse Law and the Seyhan/Ceyhan Pipeline:**

In recent years, particular legal and media attention has focused on the uses, rights, and obligations of riparians sharing *transboundary* watercourses.<sup>109</sup> The Middle East is home to numerous transboundary watercourses, the most notable being the Tigris, Euphrates, and Jordan Rivers. The Seyhan/Ceyhan Pipeline would utilize water taken from two rivers, the Seyhan and Ceyhan, that originate and terminate entirely within the sovereign territory of Turkey. Therefore, the proposed pipeline project is NOT subject to the same laws and norms that apply to transboundary watercourses.

Treaties such as The Helsinki Rules on the Uses of the Waters of International Rivers (the “Helsinki Rules”) and the 1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses are not applicable in the case of a dispute arising over the waters of the Seyhan/Ceyhan Pipeline for two reasons. First, a pipeline is not considered a transboundary river and second, although Jordan is a

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<sup>106</sup> T. Elijah Ngurare, *Legal and Institutional Implications of Cross-Border Water Pipelines in International Law: The Congo Cross-Border Water Pipeline Project (CWPP) Case Study*. The Center for Energy, Petroleum and Mineral Law and Policy, United Kingdom, 2000.

<sup>107</sup> Ibid.

<sup>108</sup> Ibid.

<sup>109</sup> The most notable legal text to emerge in recent years concerning the issue of transboundary watercourses is the *1997 UN Convention on the Law of Non-Navigational Uses of International Watercourses*.

signatory, Turkey and Syria are not signatories to the 1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses.<sup>110</sup>

### **The Status of Water in International Trade:**

It is debatable as to whether or not water in a river is a “good” in the sense of the word as understood by the GATT. To date, there is no clear agreement on this matter and it is unclear if the authors of the GATT contemplated water being sold as a good, and thus falling under the jurisdiction of the terms of the treaty, when they drafted its text. There are three basic schools of thought regarding the status of water and how it should be treated in the context of international commerce. The three schools are; water as an economic good, water as a social good, and water as both a social and an economic good.

### **The Role of the WTO:**

Turkey and Jordan are both members of the World Trade Organization (WTO). Syria is not a member of the WTO, and therefore is not subject to GATT 1994 or any subsequent agreements within the WTO body of law. Therefore, Syria’s legal obligations vis-à-vis Turkey and Jordan are regulated by international public law and any bilateral treaties maintained between Turkey, Syria, and Jordan.

Within GATT 1994, Article XI, the *General Elimination of Quantitative Restrictions*, and Article XX, *General Exceptions*, have applications in the case of the Seyhan/Ceyhan Pipeline. GATT Article XI(1) through XI(2)(a) states:

1. No prohibitions or restrictions other than duties, taxes or other charges, whether made effective through quotas, import or export licenses or other measures, shall be instituted or maintained by any contracting party on the importation of any product of the territory of any other contracting party or on the exportation or sale for export of any product destined for the territory of any other contracting party.
2. The provisions of paragraph 1 of this Article shall not extend to the following:
  - (a) Export prohibitions or restrictions temporarily applied to prevent or relieve critical shortages of foodstuffs or other products essential to the exporting contracting party;

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<sup>110</sup> Turkey voted against the Convention and Syria abstained. J.A. Allan, *The Middle East Water Question, Hydropolitics and the Global Economy*, (USA, St. Martins Press, NewYork, 2001). Pg. 298.

And GATT Article XX(g) states:

Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures:

(g) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption;

### **The Dispute Between Syria and Turkey over the Waters of the Euphrates:**

The Tigris-Euphrates Basin has been populated for close to seven thousand years and construction of waterworks within the basin date back to 3000 B.C. The region in Syria that surrounds the Euphrates is home to about one fifth of Syria's population, which is mainly active in agriculture and the oil industry. It is believed that roughly 98% of the waters of the Euphrates originate in Turkey.<sup>111</sup> The waters of the Tigris and Euphrates account for only 28% of Turkey's total water supply, however, downstream riparians Syria and Iraq are very dependent on water from these two rivers and there is no multilateral trans-basin agreement on how the waters from these two rivers are to be divided among riparians.<sup>112</sup> Turkey has refused to recognize either river as an international river and is not a signatory to the 1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses. Further complicating the Syria – Turkey relationship is a long-running dispute over the waters of the Orontes River in western Syria that flow north into the Alexandretta region of southern Turkey. Syria claims sovereignty over the waters of the river as well as the province of Alexandratta that Syria believes was wrongfully taken from them and given to Turkey in 1933 during the French Mandate.<sup>113</sup>

Turkey continues to exercise the doctrine of “absolute territorial sovereignty” over the waters of the Euphrates. This doctrine is often referred to as the “Harmon Doctrine” named after former U.S. Attorney General Judson Harmon who first espoused this water theory in 1892 in a dispute between the U.S. and Mexico over the waters of the Rio Grande.<sup>114</sup> Syria has exercised the doctrine of “absolute territorial integrity” contending

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<sup>111</sup> Arun P. Elhance, *Hydropolitics in the 3<sup>rd</sup> World*, (USA, United States Institute of Peace Press, Washington, DC, 1999). Pg. 127.

<sup>112</sup> Ibid. Pg. 139.

<sup>113</sup> Ibid. Pg. 146.

<sup>114</sup> Yonatan Lutu, “International Law and the Waters of the Euphrates and Tigris”, *Georgetown International Environmental Law Review*, Winter 2001.

that an upper riparian may not manage water in a way that harms downstream riparians.<sup>115</sup>

At the point where the Euphrates leaves Turkey and enters Syria, estimated average flow is about 29 billion cubic meters per year.<sup>116</sup> The Euphrates flow then becomes part of Lake Assad in Syria which was created with the completion of the Tabqa Dam in 1975. A large portion of this water continues downstream to Iraq, who, of the three riparians, is the most dependent on the waters of the Euphrates.

The Southeast Anatolia section of Turkey is the least developed part of the country and relies heavily on agriculture for economic sustainability. Combined, six of the eight provinces in this area contain only 1.9% of the entire country's medium and large-scale industrial operations, 1.92% of all industrial workers, and 1.98% of value added in the industrial sector.<sup>117</sup> Turkey imports about half of its energy requirements and a quarter of its electricity production depends on imported fuel. For example, in 1990, Turkey's oil bill reached \$3.5 billion.<sup>118</sup> In order to meet future energy needs without depending on outside sources and to increase the amount of irrigated land in southeast Turkey, the government has embarked on the GAP project which is discussed in more detail in the Political Background section.

There are several legal frameworks pertaining to the waters of the Euphrates and its riparians starting with the Treaty of Friendship and Neighborly Relations that was signed between Turkey and Iraq in 1946. Syria gained its independence from France that same year and never became a party to this agreement.<sup>119</sup> In 1982, Iraq and Turkey formed the Joint Technical Committee to discuss issues pertaining to waters originating in Turkey that Iraq depends on.<sup>120</sup> Syria joined this committee in 1983, however the Committee has made progress on little more than technical issues and not the more pressing issue of determining the quantity and quality of water that each riparian should receive.<sup>121</sup> Syria and Turkey signed the Protocol of Economic Cooperation in 1987 that included a guaranteed minimum flow of 500 cubic meters per second of Euphrates water to Syria in exchange for Syrian cooperation on border security issues.<sup>122</sup> Then, later that year, another protocol was signed that guaranteed Syria a minimum flow of roughly 16 billion

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<sup>115</sup> Jonathan E. Cohen, "International Law and the Water Politics of the Euphrates", 502 N.Y.U. L. REV. 507 (1991), and Yonatan Lupu, "International Law and the Waters of the Euphrates and Tigris", *Georgetown International Environmental Law Review*, Winter 2001.

<sup>116</sup> Arun P. Elhance, *Hydropolitics in the 3<sup>rd</sup> World*, (USA, United States Institute of Peace Press, Washington, DC, 1999). Pg. 141.

<sup>117</sup> Natasha Beschorner, "Water and Instability in the Middle East", Adelphi Paper 273 (London: IISS, 1992), 35.

<sup>118</sup> Arun P. Elhance, *Hydropolitics in the 3<sup>rd</sup> World*, (USA, United States Institute of Peace Press, Washington, DC, 1999). Pg. 127, and J. Kolars, "The Hydro-Imperative of Turkey's Search for Energy", *Middle East Journal* 40, No. 1, Winter 1986. Pg. 53-67.

<sup>119</sup> Arun P. Elhance, *Hydropolitics in the 3<sup>rd</sup> World*, (USA, United States Institute of Peace Press, Washington, DC, 1999). Pg. 141.

<sup>120</sup> *Ibid.* Pg. 143.

<sup>121</sup> *Ibid.* Pg. 143.

<sup>122</sup> "Protocol on Matters Pertaining to Economic Cooperation between Republic of Turkey and the Syrian Arab Republic", published in the Turkish government's *Official Gazette*, 1987.

cubic meters per year.<sup>123</sup> While this was acceptable to Syria, this was the same amount demanded from Syria by Iraq.<sup>124</sup>

In January 1990, Turkey reduced the flow of the Euphrates to a trickle for an entire month to fill the catchment area behind the recently completed Ataturk Dam. In April of 1990, Syria and Iraq signed an accord regarding the flow of the Euphrates in which Syria would receive 42% and Iraq, 58%, of the waters entering Syria from Turkey regardless of variations in the volume of the river from year to year.<sup>125</sup> Shortly thereafter, Iraq invaded Kuwait and all agreements concerning the sharing of the Euphrates between the two parties were suspended.<sup>126</sup> Then, on January 31, 2001, Syria and Iraq signed a new water sharing agreement. The details of which have not been made public, but according to Iraq the agreement incorporates “a formula for sharing the waters of the Euphrates between Iraq, Syria and Turkey and an agreement to draw up a formula on sharing the Tigris waters between Iraq and Syria”.<sup>127</sup> In August 2001, Turkey and Syria signed an undisclosed agreement that involves cooperation between the two sides on issues related to the GAP project, however, no specific commitments were made by Turkey as to the amount of water it would release to downstream riparians.<sup>128</sup>

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<sup>123</sup> Arun P. Elhance, *Hydropolitics in the 3<sup>rd</sup> World*, (USA, United States Institute of Peace Press, Washington, DC, 1999). Pg. 144.

<sup>124</sup> Ibid. Pg. 143.

<sup>125</sup> Ibid. Pg. 143.

<sup>126</sup> Ibid. Pg. 143.

<sup>127</sup> “Syria, Iraq Agree on Water-Sharing Formula”, *Agence France-Presse*, 31 January 2001.

<sup>128</sup> “Turkey, Syria Agree on Cooperation on GAP Project”, *Turkish Daily News*, 26 August 2001.

## ECONOMIC ANALYSIS

### Jordan

Economic growth is contingent upon adequate quantities of water in the municipal, industrial, and services sector which includes tourism. Jordan's per capita water availability falls well below the benchmark level of 1000 cubic meters per person annually in which water scarcity is considered to impede economic development and harm human health.<sup>129</sup> Data pertaining to financial returns for water use by sector indicates that it is in Jordan's best interest to allocate new sources of freshwater, namely water received from the proposed pipeline, to these three sectors, the municipal, industrial, and services. These sectors, relative to the agriculture sector, offer the highest financial returns at the least opportunity cost. Conversely, financial returns on water used in the agricultural sector are minimal and even negative in some instances.<sup>130</sup> As previously noted, the following chart indicates the opportunity costs of water use by sector (data is unavailable for the services sector, but returns are likely similar to those in the municipal and industrial sectors).

#### Opportunity Costs of Water Use by Sector

Sector	JD/meter <sup>3</sup> and \$/meter <sup>3</sup>	
Agriculture	2.215	\$3.10
Municipal	2.070	\$2.90
Industrial	1.289	\$1.80

*Source: The World Bank, The Hashemite Kingdom of Jordan Water Sector Review, Vol II, Annexes C-N, October 15, 1997. Annex C, Attachment 2, Pg. 8.*

Water intensive crops are a particular burden on the water resources of Jordan. Crops such as tomatoes, watermelon, and squashes are some of the most water intensive crops produced by Jordan yet the net revenue gained from their sale is low relative to revenues generated in other sectors of the economy. Water used for the production of these crops could be used more effectively on higher revenue crops or in another sector of the economy. In order to save large quantities of water in the agriculture sector the most efficient policy is to import water intensive crops rather than growing them domestically. With each ton of vegetables imported instead of grown domestically, a corresponding amount of water is made available for use somewhere else. Wheat is often cited as a crop that is easily imported, thus contributing to water conservation. However, countries often continue to produce staples such as wheat for reasons of tradition and food security.

<sup>129</sup> Hussein A. Amery and Aaron T. Wolf, *Water in the Middle East – A Geography of Peace*, (USA, University of Texas Press, 2000). Pg. 51.

<sup>130</sup> A note to the reader: The most comprehensive data available concerning water use in Jordan was produced by the World Bank in a series of reports published in the late 1990's and early part of the new century. Most of the statistical and quantitative analysis in my paper is based, in part, on the data published in one of these reports entitled "The Hashemite Kingdom of Jordan Water Sector Review" (Report #17095-JO). For a copy of the full report, including the economic models and methods used to arrive at the published data, please visit the World Bank website at [www.worldbank.org](http://www.worldbank.org).

A 2000 study on irrigation in Jordan indicates that wheat production in Jordan's southern plains is highly water intensive and economically inefficient. A ton of wheat in Jordan requires about 2000 cubic meters of water and costs \$170 to grow. Imported wheat, while requiring roughly the same amount of water, can be imported for \$155 per ton. Therefore, for every ton of domestically produced wheat, Jordan loses 2000 cubic meters of water and \$15.<sup>131</sup> This water, if allocated to another crop or economic sector entirely, could produce much higher economic returns. While the wheat example makes economic sense, it would be impossible to simply close down the agriculture sector for the sake of saving water or reallocating it to another sector of the economy.<sup>132</sup>

Assuming that the agricultural sector cannot be eliminated, one way to address water scarcity is to shift agriculture production from water intensive crops to those that are less water intensive.<sup>133</sup> As water is a highly subsidized input in the agriculture sector, Jordanian farmers do not necessarily take the true cost of water into account when determining what to grow. Compounded by the reality that water intensive crops usually result in higher revenues, farmers concentrate on growing water intensive crops to the detriment of the long-run water supply.

Due to the traditional nature of agriculture in Jordan, concerns about food security, and a population that is growing at a rate of about 3% per year, it is not likely that a major downsizing of the agriculture industry will occur in the near future. In fact, the Jordanian government is attempting to expand its total cultivatable land, however, water use is only expected to increase from about 860 MCM in 2000 to 890 MCM in 2020 due to the adoption of more efficient methods of water use.

### **Financial Returns in the Municipal and Industrial Sectors:**

As mentioned previously, the following chart indicates financial returns to water in the agriculture, municipal, and industrial sectors per a 1997 World Bank study. Data is unavailable for the services sector, but as previously mentioned returns are likely similar to those in the municipal and industrial sectors.

#### **Financial Returns on Water by Sector**

<b>Sector</b>	<b>JD/meter<sup>3</sup> and \$/meter<sup>3</sup></b>	
Agriculture – Jordan Valley	0.986	\$1.38
Agriculture - Highlands	0.832	\$1.16
Municipal	1.500	\$2.10
Industrial	5.000	\$7.00

*Source: The World Bank, The Hashemite Kingdom of Jordan Water Sector Review, Vol II, Annexes C-N, October 15, 1997. Annex C, Attachment 2, Pg. 8.*

<sup>131</sup> Radwan A. Al-Weshah, "Optimal Use of Irrigation Water in the Jordan Valley: A Case Study". (Netherlands, Kluwer Academic Publishers, 2001). Pg. 330.

<sup>132</sup> Ibid. Pg. 333.

<sup>133</sup> Ibid. Pg. 334.

According to the data, water use in the industrial sector offers the highest financial returns at \$7.00 per cubic meter and an opportunity cost of \$1.80. The municipal sector offers a return of \$2.10 per cubic meter with an opportunity cost of \$2.90. It is expected that water demand in the municipal and industrial sectors will more than double in the future from 320 MCM in 2000 to 757 MCM in 2020.<sup>134</sup> If water were completely transferable from one economic sector to another the data indicates that Jordan should allocate the majority, if not all of its available water, to the industrial sector. As the average return per cubic meter of water in the agricultural sector is \$1.27 and the average return per cubic meter in the industrial sector is \$7.00, if Jordan were to commit all of its water resources in the agricultural sector to the industrial sector total financial returns would increase by over 500%. This, of course, is not possible as it would be impossible to completely shut down the agriculture sector of the economy for reasons of tradition, food security, and the fact that roughly 5% of Jordan's entire workforce is employed in this sector.<sup>135</sup> Therefore the opportunity cost for water use in the agricultural sector cannot necessarily be reduced in the near-term, and if financial returns in the municipal and industrial sectors improve further, the opportunity cost of allocating water to the agricultural sector will weaken further relative to other sectors.

### Turkey

Turkey's balance of payments data indicates that Turkey needs revenue. Its financial situation could be partially bolstered by revenues generated from bulk water sales. If completed, the Seyhan/Ceyhan pipeline would complement existing water export facilities in Manavgat and potentially generate tens of millions of dollars in annual revenue at little cost to Turkey.

### Syria

Syria is also in need of revenue due to its large outstanding debt and potential trade losses that may result from the U.S. led war with Iraq. The Seyhan/Ceyhan Pipeline could provide Syria with much needed revenues in the form of transit fees and foreign direct investment that would accompany the construction of the pipeline.

### **Potential Revenues:**

Israel's recent water deal with Turkey gives an indication of how much potential revenue can be generated through bulk water sales. Although the price per cubic meter has not been announced, it is believed that Israel will purchase Turkish water for between \$0.18 and \$0.23 per cubic meter, but some reports indicate that Turkey may offer water as low as \$0.05 and \$0.10 per cubic meter.<sup>136</sup> If a conservative estimate is made and Turkey

<sup>134</sup> The World Bank, "Hashemite Kingdom of Jordan Update", Fourth Quarter 2001, Pg. 11-12, and Haddadin, Munther J., "Water Issues in Hashemite Jordan", *Arab Studies Quarterly*, Vol.22, Number 2, Spring 2000. Pg. 66.

<sup>135</sup> Jordan Department of Statistics, "Employment & Unemployment Survey 1999", [www.jordanembassyus.org](http://www.jordanembassyus.org).

<sup>136</sup> Amiran Cohen, "Lieberman backs plan to import Turkish water", *Ha'aretz*, 31 May 2002 and "The water issue between Turkey and Israel", *Arabic News.Com*, [www.arabicnews.com](http://www.arabicnews.com).

sells water at \$0.20 per cubic meter, Turkey will receive \$1 million for every 5 MCM of water it sells. If the Manavgat export facility were operating at its capacity of 180MCM/year, Turkey could feasibly gain \$36 million per year from that facility alone. Turkish officials have indicated that they want to increase their market for bulk water exports and sell water to Syria, Saudi Arabia, Libya, Tunisia and Algeria hoping to earn as much as \$300 million a year in export revenue.<sup>137</sup> Additionally, if the Seyhan/Ceyhan pipeline operates at full capacity (365 MCM per year), Turkey could gain \$73 million per year in revenues.

The following chart indicates potential revenue Turkey could gain from selling water to Jordan based on Jordan's projected water deficits.

#### Potential Revenue Gained by Turkey for Sale of Water

Year	Total Demand (MCM)	Total Supply (MCM)	Deficit (MCM)	Water from Turkey @ \$0.20/ meter <sup>3</sup>
1998	1205	898	(307)	No Pipeline
2005	1321	1042	(279)	No Pipeline
2010	1435	1250	(186)	\$37.2 million
2015	1536	1283	(254)	\$50.8 million
2020	1647	1287	(360)	\$72 million

*Source: The Hashemite Kingdom of Jordan Water Sector Review Update. The World Bank, February 15, 2001. Pg. 5-6.*

<sup>137</sup> Scott Peterson, "Turkey's plan for Mideast peace", *Christian Science Monitor*, 18 April 2000.

## COMMERCIAL ANALYSIS

The following section will address in detail the commercial issues presented in the section on Commercial Background. *As mentioned previously, in order to accurately assess the cost of building the Seyhan/Ceyhan pipeline a comprehensive feasibility study would need to be conducted. A proper feasibility study falls outside the scope of this Master's Project as it is very cost and labor intensive. In the absence of such a study, cost estimates made throughout the remainder of this paper must not be taken as definitive figures.*

### Cost Projection Number 1:

The Ministry of Water and Irrigation in Jordan estimates that from 2015 to 2020, Jordan's water deficit will be between 254 and 360 MCM per year. It is likely that this deficit will increase in subsequent years. For the sake of this study I will err on the side of caution and assume that Jordan will need at least 365 MCM of water per year (roughly 1 MCM per day) from 2020 on. This capacity projection is one-sixth that of the original Peace Pipeline. One way to estimate the cost of the Seyhan/Ceyhan pipeline is to prorate the cost of the peace pipeline according to other available cost figures. As noted, the Peace Pipeline would have cost \$3.2 million per kilometer to build. One-sixth of this figure is \$533,333 per kilometer.

The U.S. energy firm Halliburton estimates that if the Peace Pipeline were to be built today, it would cost twice the 1987 estimate.<sup>138</sup> Therefore, if per kilometer figures based on the smaller Seyhan/Ceyhan Pipeline are doubled, the cost of the pipeline is \$533,333 X 2 per kilometer, which equals \$1,066,666 per kilometer or \$1,066 per meter.

Total pipeline construction cost can be estimated by the following equation:

$$\text{Pipeline Construction Cost} = \text{Number of meters} \times \text{cost per meter}$$

Therefore, the cost of the pipeline would be: 750,000 meters X \$1,066 = \$799,500,000 or roughly **\$800 million**.

### Cost Comparison of other Projects in Jordan:

Other major pipeline projects in Jordan can be used to compare costs. Based on the projected costs of projects such as the Disi-Amman Conveyor and the Red-Dead Pipeline, \$800 million is likely a very low estimate. The Disi-Amman Conveyor is estimated to cost \$1,750 per meter to build and the Red-Dead pipeline is estimated to cost \$4,400 per meter.<sup>139</sup> Based on available information it is assumed that these costs include dams, other necessary structures, and pumping stations. The following chart gives a breakdown of the cost of the Disi-Amman Conveyor and the Red-Dead Pipeline. As the

<sup>138</sup> The original feasibility study for the 1987 peace pipeline was carried out by the engineering firm Brown & Root which has since been acquired by Halliburton.

<sup>139</sup> EnviroConsult (ECO) Jordan.

data indicates, there is a wide range of potential costs for pipeline construction, making accurate estimates for the cost of construction of the Seyhan/Ceyhan pipeline difficult in the absence of a formal feasibility study.

<b>Project</b>	<b>Cost per Meter</b>	<b>Total Cost (millions)</b>
Disi-Amman Conveyor	\$1,750	\$588
Red-Dead Pipeline	\$4,400	\$880

### **Cost Projection Number 2:**

In researching the cost of pipelines, several water engineers were able to provide some rough figures on the potential cost of the Seyhan/Ceyhan pipeline.<sup>140</sup> Their contributions and ideas are incorporated into the following cost projections.

Assuming that the pipeline would carry 1 MCM per day, one pipe with a diameter of 2.4 meters (96 inches), or a series of smaller pipes, would be necessary. The life of a pipeline is roughly 80-100 years. Estimates vary widely as to how much it would cost to install a pipeline of this size. Rough cost estimates place the price of pipe that is 2.4 meters in diameter at between \$1500 - \$2500 per meter. Assuming that the pipeline covers a distance of approximately 750 kilometers, the total cost of pipe installation would be between \$1.125 billion and \$1.875 billion. Other structures such as dams and tunnels could cost anywhere between \$100 and \$600 million. Pumping stations to move the water through the system could cost between \$80 and \$150 million. An added contingency cost of 20% has been added to total capital costs. The following chart gives a breakdown of these potential costs:

### **Capital Costs for the Seyhan/Ceyhan Pipeline**

<b>Item</b>	<b>Low Estimate</b>	<b>High Estimate</b>
Pipe (per meter)	\$1,500	\$2,500
<b>Item</b>	<b>Low Estimate (millions)</b>	<b>High Estimate (millions)</b>
Pipe (750 km)	\$1,125	\$1,875
Dams and other Structures	\$100	\$600
Pumping Stations	\$80	\$150
<b>Subtotal</b>	<b>\$1,305</b>	<b>\$2,625</b>
Contingency (20%)	\$261	\$525
<b>Total</b>	<b>\$1,566</b>	<b>\$3,150</b>
<b>Per Meter Cost</b>	<b>\$2,088</b>	<b>\$4,200</b>

<sup>140</sup> I am extremely grateful to a handful of individuals who were very generous in helping me determine rough commercial estimates for this project. I would especially like to thank Mary Louise Vitelli of Advanced Engineering Associates International, Michael Joyce of Kennedy/Jenks Consultants, and Dr. Angelos Findikakis of Bechtel. While these individuals provided me with excellent guidance and ideas, any analytical errors in this project are solely my own.

As these rough estimates indicate, total capital cost for the pipeline could be somewhere between \$1.566 billion and \$3.150 billion with per meter costs ranging from \$2,088 to \$4,200.

### **Operation and Maintenance Costs (O&M):**

As mentioned previously, operating and maintenance costs (O&M) are based upon several factors including the following:

- Amortized loan payments to lenders who finance pipeline construction.
- Electricity needed to run pumping stations.
- Maintenance costs
- The cost of water from Turkey.

The cost effectiveness of the Seyhan/Ceyhan pipeline can be determined by comparing the unit cost of water produced to that of alternatives. In order to make this calculation, O&M costs and the quantity of water pumped through the pipeline are required. It is assumed that Jordan will purchase 365 MCM of water in 2020. As in the case of initial pipeline construction, O&M costs must be estimated due to a lack of a proper feasibility study.

I will assume that loans will be granted at an interest rate of 5% and amortized over 30 years. Electricity costs to pump 365 MCM of water per day can vary greatly and as energy costs are unknown an estimate must be made. I will assume that annual energy costs will be between \$3-\$10 million per year. Maintenance costs are estimated to be 1% of total cost per year.

The following scenarios indicate the cost to produce one cubic meter of water given annual O&M costs based on an initial 30 year loan repayment period followed by a 70 year period in which the pipeline would be operating without the burden of repaying initial capital costs. Cost per cubic meter is determined by dividing annual O&M costs by the quantity of water produced. The lower the cost per cubic meter, the more lucrative the project will be to policymakers.

A 100 year timeframe was chosen as the long range lifespan of a pipeline the size of the Seyhan/Ceyhan would be 80 - 100 years. While a 100 year cost projection is not likely to be entirely accurate due to changes in technology, capital costs, and energy prices, these figures are meant to give policymakers a rough idea of the long-run costs of potential alternatives to the Seyhan/Ceyhan pipeline. Cost calculations for years 31-100 include replacing pumping stations every 30 years (three times) over the life of the pipeline.

The following chart gives a breakdown of annual O&M costs for the Seyhan/Ceyhan pipeline:

**Annual O&M Costs and Costs per Cubic Meter of Water Produced  
(0-30 Years)**

<b>Item</b>	<b>Low (millions)</b>	<b>High (millions)</b>
Capital Costs	\$1,566	\$3,150
Amortized Loan at 5%	\$102	\$205
Pumping Costs	\$3	\$10
Maintenance 1%	\$15.7	\$31.5
<b>Annual O&amp;M Total</b>	<b>\$120.7</b>	<b>\$246.5</b>
<b>Cost per Cubic Meter</b>	<b>\$0.33</b>	<b>\$0.68</b>

**Annual O&M Costs and Costs per Cubic Meter of Water Produced  
(31-100 Years)**

<b>Item</b>	<b>Low (millions)</b>	<b>High (millions)</b>
Pipe	\$0.00	\$0.00
Amortized Loan 5%	\$0.00	\$0.00
Pumping Stations <sup>141</sup>	\$3.4	\$6.4
Pumping Costs	\$3	\$10
Maintenance 1%	\$15.7	\$31.5
<b>Annual O&amp;M Total</b>	<b>\$22.1</b>	<b>\$47.9</b>
<b>Cost per Cubic Meter</b>	<b>\$0.06</b>	<b>\$0.13</b>

**Cost to Purchase Water from Turkey:**

According to available information and published “best guesses”, the price Turkey would charge Jordan for the purchase of its water could be as low as \$0.05 per cubic meter or as high as \$0.23 per cubic meter. I will assume that Turkey will sell water to Jordan for approximately the same price it will likely sell water to Israel, roughly \$0.20 per cubic meter. The price Jordan could expect to pay Turkey for the purchase of its water can be calculated by the following equation:

$$\text{Price of Water} = \$0.20 \text{ multiplied by number of cubic meters purchased}$$

Jordan’s projected water deficit in 2010 is 186 million cubic meters of water. If Jordan were to satisfy this entire deficit with Turkish water at \$0.20 per cubic meter the purchase price of water would be \$37.2 million. Following is a chart of projected water needs and

<sup>141</sup> Capital costs for pumping stations are based on a prorated cost for the life of the pipeline. If it is assumed that all pumping stations will be replaced every 30 years (three times over the life of the pipeline, not including initial installation), the annual capital cost of pumping stations can be determined by taking the total cost of pumping stations from years 31-100 and dividing by 70 (total years approx.). In the case of the Seyhan-Ceyhan pipeline, low pumping station estimates are \$240 million from year 31-70 (\$80 million x 3) and high estimates are \$450 million (\$150 million x 3) for the same time period. Therefore, estimates place annual pumping station costs at \$3.4 million (low) and \$6.4 million (high).

deficits through 2020 with costs to Jordan if it were to meet its deficits through the purchase of Turkish water. This chart assumes that the earliest a pipeline could be in place is 2010.

### Water Demand and Supply Requirements in Jordan 1998-2020 (MCM/Year)

Year	Total Demand (MCM)	Total Supply (MCM)	Deficit (MCM)	Water from Turkey @ \$0.20/ meter <sup>3</sup>
1998	1205	898	(307)	No Pipeline
2005	1321	1042	(279)	No Pipeline
2010	1435	1250	(186)	\$37.2 million
2015	1536	1283	(254)	\$50.8 million
2020	1647	1287	(360)	\$72 million

*Source: The Hashemite Kingdom of Jordan Water Sector Review Update. The World Bank, February 15, 2001. Pg. 5-6.*

### Final Cost of Water from Turkey:

In the case of the Seyhan/Ceyhan Pipeline, final unit costs are calculated by adding the cost per cubic meter to deliver water through the pipeline and the price Turkey charges for its water. As mentioned previously, the price Turkey charges Jordan could be as low as \$0.05 per cubic meter, or as high as \$0.23, depending on the quantity of water purchased. The following formula accounts for the final cost of water per cubic meter:

$$\text{Final Cost per Cubic Meter} = \text{Cost to Pump per Cubic Meter} + \text{Purchase Price of Water per Cubic Meter}$$

The total cost per cubic meter of water that Jordan could expect to pay is broken down in the following chart based on a low (\$0.33 + \$0.05) and high (\$0.68 + \$0.23) price:

### Total Cost of Water per Cubic Meter (0-30 Years)

Year	Quantity (MCM) (Based on projected deficit)	Cost Low (\$0.38 per meter <sup>3</sup> ) Millions	Cost High (\$0.91 per meter <sup>3</sup> ) Millions
1998	307	No Pipeline	No Pipeline
2005	279	No Pipeline	No Pipeline
2010	186	\$70.7	\$169.3
2015	254	\$96.5	\$231
2020	365	\$138.7	\$332.2

The total cost per cubic meter of water that Jordan could expect to pay is broken down in the following chart based on a low (\$0.06 + \$0.05) and high (\$0.13 + \$0.23) price:

**Total Cost of Water per Cubic Meter  
(31-100 Years)**

<b>Year</b>	<b>Quantity (MCM) (Based on projected deficit)</b>	<b>Cost Low (\$0.11 per meter<sup>3</sup>) Millions</b>	<b>Cost High (\$0.36 per meter<sup>3</sup>) Millions</b>
1998	307	No Pipeline	No Pipeline
2005	279	No Pipeline	No Pipeline
2010	186	\$20.5	\$67
2015	254	\$27.9	\$91.4
2020	365	\$40.2	\$131.4

In comparison, it is estimated that the Disi-Amman Conveyor will produce water at a cost of about \$0.28 per cubic meter plus annual O&M costs of \$0.42 per cubic meter for a total of \$0.70 per cubic meter.<sup>142</sup> Cost comparisons for alternatives to the Seyhan/Ceyhan pipeline are addressed in the next section.

**Alternatives to the Seyhan/Ceyhan Pipeline:**

Desalination of seawater, importing Turkish water via tankership or waterbag, and desalinated water gained from the Red-Dead pipeline are potential alternatives to the Seyhan/Ceyhan pipeline, however, all of these options are prohibitively expensive. Following is an analysis of these alternatives.

**Waterbags:** The idea of transporting water in bags is now a reality. Based on the principle that freshwater is lighter than saltwater, freshwater can be towed across oceans in giant “Medusa bags” on routes that were previously dominated by oceangoing water tankers. Waterbags have been used since the mid-1990’s to supply islands in Greece with freshwater at half the cost of tankers.<sup>143</sup>

In an analysis published in 2000 that involves using Medusa bags to supply water to Israel and Jordan, it is estimated that the first 250 MCM of water would cost about \$0.17 per cubic meter, and then drop to \$0.09 per cubic meter thereafter.<sup>144</sup> This price is excellent in comparison to desalination, pumping from aquifers, or even the Seyhan/Ceyhan pipeline, but it does not include transportation costs. Most importantly, however, is that the delivery of enough water to meet Jordan’s needs is unfeasible at the

<sup>142</sup> The World Bank, *The Hashemite Kingdom of Jordan Water Sector Review, Vol II, Annexes C-N, October 15, 1997*. Annex C, Attachment 1.

<sup>143</sup> Medusa Water International Ltd., [http://www.cix.co.uk/~savage/medusabag/medusa\\_bag\\_concept.htm](http://www.cix.co.uk/~savage/medusabag/medusa_bag_concept.htm)

<sup>144</sup> Jon Gorvett, “A capital commodity”, *Middle East*, Jul/Aug 2000. London.

technical level as the capacity of the largest Medusa bag is only about 1.75 MCM.<sup>145</sup> In order to meet Jordan's water deficit of 360 MCM in 2020 a total of 209 bags per year would have to be shipped and unloaded in Aqaba, Jordan's only port. Upon arrival, the water would need to be pumped roughly 300 kilometers north to Amman for consumption. Based on estimates done by Keith Spain regarding the transport of water by waterbag from Canada to California, it is estimated that water would cost \$0.78 per cubic meter if delivered over a distance of 1288 kilometers (800 miles), which is roughly the same distance by sea between the Seyhan and Ceyhan Rivers and Aqaba.<sup>146</sup>

Costs for the delivery of water by waterbag are estimated in the following charts. Although Jordan's water deficit is projected to be 360 MCM in 2020, as in the case of the Seyhan/Ceyhan pipeline analyses are based on 365 MCM.

#### Cost to Deliver Water by Waterbag from Turkey to Aqaba, Jordan

Item	Cost
Cubic Meter of Water	\$0.78
Item	Cost (millions)
365 MCM of Water	\$284.7

Pipeline Costs: As with the Seyhan/Ceyhan pipeline, the following assumptions are made; pipe will cost between \$1,500 - \$2,500 per meter, loans will be amortized at a rate of 5% over a period of 30 years, and a contingency factor of 20% will be included.

#### Capital Costs for the Aqaba – Amman Pipeline

Item	Low	High
Pipe (per meter)	\$1,500	\$2,500
Item	Low (millions)	High (millions)
Pipe (300 km)	\$450	\$750
Pumping Stations	\$80	\$150
Dams and other Structures	\$100	\$600
Subtotal	\$630	\$1,500
Contingency 20%	\$63	\$150
<b>Total</b>	<b>\$693</b>	<b>\$1,650</b>

<sup>145</sup> Medusa Water International Ltd., [http://www.cix.co.uk/~savage/medusabag/medusa\\_bag\\_concept.htm](http://www.cix.co.uk/~savage/medusabag/medusa_bag_concept.htm)

<sup>146</sup> In Keith Spain's original analysis, the purchase price of water from Canada was not separated out from the cost to transport that water, so it is unclear whether or not the majority of the cost per cubic meter of water from Canada, \$0.78, is a result of the purchase price or transportation costs. For the sake of my analysis I am assuming that the purchase price of water from Canada is similar to that which Turkey would charge. Therefore, the \$0.78 figure is all inclusive.

**Annual O&M Costs and Costs per Cubic Meter of Water Produced  
(0-30 Years)**

<b>Item</b>	<b>Low (millions)</b>	<b>High (millions)</b>
Capital Costs	\$693	\$1,650
Amortized Loan at 5%	\$45	\$107
Pumping Costs	\$1.5	\$5
Maintenance 1%	\$6.93	\$16.5
<b>Annual O&amp;M Total</b>	<b>\$53.4</b>	<b>\$128.5</b>
<b>Cost per Cubic Meter</b>	<b>\$0.15</b>	<b>\$0.35</b>

**Annual O&M Costs and Costs per Cubic Meter of Water Produced  
(31-100 Years)**

<b>Item</b>	<b>Low (millions)</b>	<b>High (millions)</b>
Pipeline	\$0.00	\$0.00
Amortized Loan at 5%	\$0.00	\$0.00
Pumping Stations	\$3.4	\$6.4
Pumping Costs	\$1.5	\$5
Maintenance 1%	\$6.93	\$16.5
<b>Annual O&amp;M Total</b>	<b>\$11.8</b>	<b>\$27.9</b>
<b>Cost per Cubic Meter</b>	<b>\$0.03</b>	<b>\$0.08</b>

Total cost per cubic meter is derived by combining the cost per cubic meter to deliver water by waterbag plus the cost to pipe it to Amman. The following chart indicates cost per cubic meter of water in the first 30 years of operation and the last 70 years of operation.

**Final Cost of Water Delivered by Waterbag**

<b>Timeframe</b>	<b>Low (per meter<sup>3</sup>)</b>	<b>High (per meter<sup>3</sup>)</b>
0-30 Years	\$0.93	\$1.13
31-100 Years	\$0.81	\$0.86

**Tankerships:** Transporting water by converted tankership involves obstacles similar to those in the waterbag scheme. A tankership costs about \$35,000 per day to operate.<sup>147</sup> Loading and unloading water would pose similar logistical problems to that of the waterbag scheme, and standard size converted oil tankers don't necessarily have the capacity to meet Jordan's water needs. For example, the *Prestige* oil tanker which sank off the coast of Spain in November 2002 had a capacity of 20 million gallons (75,708 cubic meters). It would take 4821 of these tankers per year, 13 per day, to carry enough

<sup>147</sup> See Commercial Diplomacy Master's Project completed by Keith Spain at the Monterey Institute of International Studies, "Recommendations for the U.S. Trade Representative to Negotiate Trade Rules with Canada Governing Bulk Water Exports", 30 June 2002. Pg. 51.

water to meet Jordan's water deficit in 2020. Supertankers have a much larger capacity, roughly 400,000 cubic meters, but they are also more expensive to operate and take longer to load and unload. It would take 913 supertankers, 2-3 per day, to meet Jordan's water deficit in 2020. Like the waterbag scheme, a pipeline would have to be built to carry the water from Aqaba to Amman upon arrival.

If it is assumed that travel time between Turkey and Aqaba, Jordan is 5 days one way, a tanker would need to be hired for ten continuous days for one round trip. As mentioned, the estimated cost to hire a tankership is about \$35,000 per day. Although numerous tankers would be needed to continually supply Jordan with water, cost per cubic meter can be estimated by analyzing figures for one tanker with a cargo of 75,000 cubic meters of water. Hiring a tanker for ten days would cost roughly \$350,000 (\$35,000 per day x 10 days). Water delivered to Aqaba would cost \$4.67 per cubic meter (\$350,000 divided by 75,000 cubic meters). This water would then need to be piped to Amman.

Pipeline Costs: As with the Seyhan/Ceyhan pipeline, the following assumptions are made; pipe costs between \$1,500 - \$2,500 per meter, loans will be amortized at a rate of 5% over a period of 30 years, a 1% maintenance fee will be included, along with a 20% contingency factor.

#### Capital Costs for the Aqaba – Amman Pipeline

Item	Low	High
Pipe (per meter)	\$1,500	\$2,500
Item	Low (millions)	High (millions)
Pipe (300 km)	\$450	\$750
Pumping Stations	\$80	\$150
Dams and other Structures	\$100	\$600
Subtotal	\$630	\$1,500
Contingency 20%	\$63	\$150
<b>Total</b>	<b>\$693</b>	<b>\$1,650</b>

#### Annual O&M Costs and Costs per Cubic Meter of Water Produced by the Aqaba – Amman Pipeline (0-30 Years)

Item	Low (millions)	High (millions)
Capital Costs	\$693	\$1,650
Amortized Loan at 5%	\$45	\$107
Pumping Costs	\$1.5	\$5
Maintenance 1%	\$6.93	\$16.5
<b>Annual O&amp;M Total</b>	<b>\$53.4</b>	<b>\$128.5</b>
<b>Cost per Cubic Meter</b>	<b>\$0.15</b>	<b>\$0.35</b>

**Annual O&M Costs and Costs per Cubic Meter of Water Produced  
(31-100 Years)**

Item	Low (millions)	High (millions)
Pipeline	\$0.00	\$0.00
Amortized Loan at 5%	\$0.00	\$0.00
Pumping Stations	\$3.4	\$6.4
Pumping Costs	\$1.5	\$5
Maintenance 1%	\$6.93	\$16.5
<b>Annual O&amp;M Total</b>	<b>\$11.8</b>	<b>\$27.9</b>
<b>Cost per Cubic Meter</b>	<b>\$0.03</b>	<b>\$0.08</b>

Total cost per cubic meter is derived by combining the cost per cubic meter to ship the water to Aqaba plus the cost to pipe it to Amman. The following chart indicates cost per cubic meter of water in the first 30 years of operation and the last 70 years of operation.

**Final Cost of Water Delivered by Tankerships**

Timeframe	Low (per meter <sup>3</sup> )	High (per meter <sup>3</sup> )
0 – 30 Years	\$4.82	\$5.02
31 – 100 Years	\$4.70	\$4.75

**Desalination Plants:** Desalination is the most attractive alternative to the Seyhan/Ceyhan pipeline because it would allow Jordan to completely control its source of freshwater within its borders from processing to delivery. Israel, motivated by similar concerns, is currently building a series of high-volume desalination plants to meet a portion of its freshwater deficit. One of the largest of these plants, being built in the coastal city of Ashdod at a cost of \$110 million, will desalinate about 50 MCM of water per year.<sup>148</sup> Once completed, each cubic meter of water will cost between \$0.60 and \$0.65 to produce.<sup>149</sup>

To meet Jordan's projected deficit of 360 MCM in 2020 a total of seven desalination plants similar to the Ashdod plant would be necessary. As Jordan only has one city with access to the sea, Aqaba, all seven of these plants would have to be built in this location. As in the waterbag scheme, a pipeline would have to be built to transport this water roughly 300 kilometers from Aqaba to Amman after it is desalinated.

The lifespan of a typical desalination plant is about 20-30 years. Therefore, large capital expenditures would need to be made accordingly in order to replace outdated equipment as it expires in order to maintain desalination capacity. Capital costs for this scenario are as follows: \$770 million for the initial construction of 7 desalination plants, each with a capacity of 50MCM per year, at a cost of \$110 million per plant. All desalination plants

<sup>148</sup> "Second Israeli desal plant approved", *Global Water Intelligence*, January 2001.

[www.globalwaterintel.com](http://www.globalwaterintel.com).

<sup>149</sup> Ibid.

will need to be replaced every 20 – 30 years. Over the course of 100 years this would require a total of 28 desalination plants at a total capital cost of \$3.08 billion. Cost to produce each cubic meter of water can be based on cost projections related to desalination plants being built in Israel (\$0.60 - \$0.65 per cubic meter), however the additional cost of transporting the water by pipeline roughly 300 kilometers from Aqaba to Amman must be included.

Pipeline Costs: As with the Seyhan/Ceyhan pipeline, the following assumptions are made; pipe will cost between \$1,500 - \$2,500 per meter, loans will be amortized at a rate of 5% over a period of 30 years, a 1% maintenance fee will be included, along with a 20% contingency factor.

#### Capital Costs for the Aqaba – Amman Pipeline

Item	Low	High
Pipe (per meter)	\$1,500	\$2,500
Item	Low (millions)	High (millions)
Pipe (300 km)	\$450	\$750
Pumping Stations	\$80	\$150
Dams and other Structures	\$100	\$600
<b>Subtotal</b>	<b>\$630</b>	<b>\$1,500</b>
Contingency 20%	\$63	\$150
<b>Total</b>	<b>\$693</b>	<b>\$1,650</b>

#### Annual O&M Costs and Costs per Cubic Meter of Water Produced (0-30 Years)

Item	Low (millions)	High (millions)
Capital Costs	\$693	\$1,650
Amortized Loan at 5%	\$45	\$107
Pumping Costs	\$1.5	\$5
Maintenance 1%	\$6.93	\$16.5
<b>Annual O&amp;M Total</b>	<b>\$53.4</b>	<b>\$128.5</b>
<b>Cost per Cubic Meter</b>	<b>\$0.15</b>	<b>\$0.35</b>

**Annual O&M Costs and Costs per Cubic Meter of Water Produced  
(31-100 Years)**

Item	Low (millions)	High (millions)
Pipeline	\$0.00	\$0.00
Amortized Loan at 5%	\$0.00	\$0.00
Pumping Stations	\$3.4	\$6.4
Pumping Costs	\$1.5	\$5
Maintenance 1%	\$6.93	\$16.5
<b>Annual O&amp;M Total</b>	<b>\$11.8</b>	<b>\$27.9</b>
<b>Cost per Cubic Meter</b>	<b>\$0.03</b>	<b>\$0.08</b>

Total cost per cubic meter is derived by combining the cost per cubic meter to desalinate water in Aqaba plus the cost to pipe it to Amman. The following chart indicates cost per cubic meter of water in the first 30 years of operation and the last 70 years of operation.

**Final Cost of Desalinated Water**

Timeframe	Low (per meter <sup>3</sup> )	High (per meter <sup>3</sup> )
0 – 30 Years	\$0.75	\$0.95
31 – 100 Years	\$0.63	\$0.68

**The Red-Dead Canal and Pipeline:** As was previously mentioned, a plan has been put forth by the Jordanian and Israeli Governments to construct a canal and pipeline to refill the Dead Sea with water from the Red Sea. This project entails a pipeline system originating in Aqaba carrying seawater roughly 200 kilometers inland to the Dead Sea. This water could be utilized along the way for desalination and power generation prior to entering the Dead Sea. One of the motives behind this proposal is that the level of the Dead Sea has dropped roughly 20 meters in the past 40 years from 392 meters below sea level to 412 meters below sea level. If this pattern continues over the next ten years the Dead Sea will lose over one-third of its prior total surface area, receding to 650 square kilometers from 1,000 square kilometers recorded as recently as the 1960's.<sup>150</sup>

This system is projected to carry 1.8 billion cubic meters of saltwater with 850 MCM of this targeted for desalination and distribution between Israel and Jordan. The proposal indicates that two-thirds of this freshwater (560 MCM) will be piped to Amman and the remaining third (290 MCM) to the West Bank and Jerusalem. Desalination plants will be powered mainly with hydro-electric energy generated by utilizing the elevation difference between the hills surrounding the Dead Sea and the shoreline. As pipeline water falls from 126 meters above sea level to the banks of the Dead Sea at 400 meters below sea level roughly 550 megawatts of electricity will be generated and used to power

<sup>150</sup> Jordan Times, March 5, 2002.

desalination and pumping facilities with additional electricity being made available to local communities.<sup>151</sup>

The initial cost of this project is cited at roughly \$4 billion, with the cost of the pipeline being an estimated \$800 million and the installation of initial desalination and distribution facilities an additional \$3 billion.<sup>152</sup> This project is expected to meet Jordan's freshwater needs up to about 2030.<sup>153</sup>

The desalination component of the Red-Dead pipeline poses similar problems to that of a desalination scheme in Aqaba. As the lifespan of desalination plants is 20-30 years, large capital expenditures would need to be made accordingly in order to replace outdated equipment and maintain desalination capacity. If desalination plants the size of those being built in Israel are used (50 MCM per year of capacity), it will take roughly 17 plants to meet the desalination capacity target of 850 MCM per year. Over the course of 100 years these desalination plants will need to be replaced three times which equates to a total of 51 desalination plants over a 100 year period. If each plant is assumed to cost \$110 million, long run capital costs for desalination plants alone will total \$5.61 billion. Additional costs would need to be added for pumping stations, but as there is a lack of detailed information on the pumping needs of this project it is impossible to make this estimate at this time.

Costs per cubic meter of water produced can be based on the cost of other desalination plants in the region. However, due to the contribution of cheap hydroelectric power to the cost of desalinating water, the cost per cubic meter of water produced is expected to be lower than a typical desalination plant. Therefore, a rough figure of \$0.50 - \$0.65 per cubic meter will be assumed. This is slightly lower than estimates to produce water at desalination plants in Israel that will likely have similar capacity with a high range of \$0.65 per cubic meter maintained as a conservative estimate due to the fact that not all of the cost information related to this project is available. By assuming that costs per cubic meter will not exceed those of a typical desalination plant, this project will be considered at least as competitive as other desalination alternatives. Following is a rough breakdown of costs of the Red-Dead project based on available information:

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<sup>151</sup> "The Dead Sea, Ancient Treasure, 21<sup>st</sup> Century Opportunity", Jordanian Ministry of Water and Irrigation and Ministry of Planning, 2002. Pg. 12, 15.

<sup>152</sup> Ibid. Pg. 17.

<sup>153</sup> Ibid. Pg. 15.

**Costs of Red-Dead Pipeline  
(0-30 Years)**

<b>Item</b>	<b>Cost</b>
Pipe (per meter)	\$4,400
Desalination Plant (50 MCM capacity)	\$110 million
<b>Item</b>	<b>Cost (millions)</b>
Pipeline (Approx. 200 km)	\$800
Pumping Stations	N/A
Dams and Other Structures	N/A
Desalination Plant x 17	\$1,870
Distribution System	\$1,330
Contingency 20%	Included
<b>Subtotal</b>	<b>\$4,000</b>
<b>Cost per Cubic Meter of Water</b>	<b>\$0.50 - \$0.65</b>

**Costs of Red-Dead Pipeline  
(31-100 Years)**

<b>Item</b>	<b>Cost (millions)</b>
Desalination Plant (50 MCM capacity)	\$110
<b>Item</b>	<b>Cost (millions)</b>
Desalination Plant x 51	\$5,610
Pumping Stations	N/A
Contingency 20%	N/A
<b>Subtotal</b>	<b>\$5,610</b>
<b>Cost per Cubic Meter of Water</b>	<b>\$0.50 - \$0.65</b>

**Final Cost of Desalinated Water per Red-Dead Pipeline**

<b>Timeframe</b>	<b>Low (per meter<sup>3</sup>)</b>	<b>High (per meter<sup>3</sup>)</b>
0 – 30 Years	\$0.50	\$0.65
31 – 100 Years	\$0.50	\$0.65

The following charts show comparative estimated costs for the Seyhan/Ceyhan pipeline along with potential alternatives. Cost estimates are broken into estimates for the first 30 years of each project and the final 70 years of each project for a total of 100 years.

**Final Comparative Costs for Water  
(0-30 Years)**

<b>Source of Water</b>	<b>Cost per Meter<sup>3</sup> from Turkey (A)</b>	<b>Cost per Meter<sup>3</sup> to Deliver (B)</b>	<b>Total Cost per Meter<sup>3</sup> (A+B)</b>
<b>Seyhan/Ceyhan Pipe</b>	<b>\$0.05 - \$0.23</b>	<b>\$0.33 - \$0.68</b>	<b>\$0.38 - \$0.91</b>
Red Dead Pipeline	\$0.00	\$0.50 - \$0.65	\$0.50 - \$0.65
Desalination	\$0.00	\$0.75 - \$0.95	\$0.75 - \$0.95
Waterbags <sup>154</sup>	\$0.05 - \$0.23	\$0.93 - \$1.13	\$0.98 - \$1.36
Tankerships <sup>155</sup>	\$0.05 - \$0.23	\$4.82 - \$5.02	\$4.87 - \$5.25

**Final Comparative Costs for Water  
(31-100 Years)**

<b>Source of Water</b>	<b>Cost per Meter<sup>3</sup> from Turkey (A)</b>	<b>Cost per Meter<sup>3</sup> to Deliver (B)</b>	<b>Total Cost per Meter<sup>3</sup> (A+B)</b>
<b>Seyhan/Ceyhan Pipe</b>	<b>\$0.05 - \$0.23</b>	<b>\$0.06 - \$0.13</b>	<b>\$0.11 - \$0.36</b>
Red Dead Pipeline	\$0.00	\$0.50 - \$0.65	\$0.50 - \$0.65
Desalination	\$0.00	\$0.63 - \$0.68	\$0.63 - \$0.68
Waterbags <sup>156</sup>	\$0.05 - \$0.23	\$0.81 - \$0.86	\$0.86 - \$1.09
Tankerships <sup>157</sup>	\$0.05 - \$0.23	\$4.70 - \$4.75	\$4.75 - \$4.98

**Recovering Costs**

Commercial feasibility of the Seyhan/Ceyhan pipeline is based, in part, on Jordan's ability to collect revenues on water and use these funds to pay operating costs of the pipeline. This section will present several cost recovery scenarios indicating steps Jordan should take in order to maximize revenues.

The following chart indicates O&M costs Jordan will likely pay for water produced by the Seyhan/Ceyhan pipeline based on Turkey selling water to Jordan for \$0.05 - \$0.23 per cubic meter.

<sup>154</sup> This figure is based on the Commercial Diplomacy Master's Project completed by Keith Spain at the Monterey Institute of International Studies, "Recommendations for the U.S. Trade Representative to Negotiate Trade Rules with Canada Governing Bulk Water Exports", 30 June 2002. Pg. 51.

<sup>155</sup> This figure is based on a tankership carrying 75,000 cubic meters of water at a daily cost of \$35,000 per day for ten days (approximate roundtrip transit time from Turkey to Aqaba) plus \$0.70 per cubic meter to pump the water from Aqaba, Jordan to Amman for consumption.

<sup>156</sup> This figure is based on the Commercial Diplomacy Master's Project completed by Keith Spain at the Monterey Institute of International Studies, "Recommendations for the U.S. Trade Representative to Negotiate Trade Rules with Canada Governing Bulk Water Exports", 30 June 2002. Pg. 51.

<sup>157</sup> This figure is based on a tankership carrying 75,000 cubic meters of water at a daily cost of \$35,000 per day for ten days (approximate roundtrip transit time from Turkey to Aqaba) plus \$0.70 per cubic meter to pump the water from Aqaba, Jordan to Amman for consumption.

**Total Cost of Water 0-30 Years**  
(Includes cost to deliver and purchase price from Turkey)

<b>Year</b>	<b>Quantity (MCM) (Based on projected deficit)</b>	<b>Cost Low (\$0.38 per meter<sup>3</sup>) Millions</b>	<b>Cost High (\$0.91 per meter<sup>3</sup>) Millions</b>
1998	307	No Pipeline	No Pipeline
2005	279	No Pipeline	No Pipeline
2010	186	\$70.7	\$169.3
2015	254	\$96.5	\$231
<b>2020</b>	<b>365</b>	<b>\$138.7</b>	<b>\$332.2</b>

**Total Cost of Water 31-100 Years**  
(Includes cost to deliver and purchase price from Turkey)

<b>Year</b>	<b>Quantity (MCM) (Based on projected deficit)</b>	<b>Cost Low (\$0.11 per meter<sup>3</sup>) Millions</b>	<b>Cost High (\$0.36 per meter<sup>3</sup>) Millions</b>
2031	365	\$40.2	\$131.4
2040	365	\$40.2	\$131.4
2045	365	\$40.2	\$131.4
2050	365	\$40.2	\$131.4
2055	365	\$40.2	\$131.4

Costs can be recovered through tariffs generated through Jordan's existing fee structure that is administered by the MWI if a proper enforcement mechanism is in place. As was previously noted, tariffs per cubic meter of water in Jordan are the highest in the industrial, hotel and municipal sectors, and the majority of water from the pipeline will likely be consumed by these three sectors. Following is Jordan's current tariff structure:

**Water Tariffs in Jordan by Sector**

<b>Sector</b>	<b>Tariff (\$ per meter<sup>3</sup>)</b>
Industry <sup>158</sup>	\$2.00
Within Qualifying Industrial Zone <sup>159</sup>	\$2.10
Hotels <sup>160</sup>	\$1.40
<b>Residential<sup>161</sup> (meters<sup>3</sup>)</b>	<b>Greater Amman (\$ per meter<sup>3</sup>)</b>
1-20	\$2.84 (total)
21-40	\$0.20

<sup>158</sup> This figure is based on published rate per cubic meter according to the Central Bank of Jordan, <http://www.jordaninvestment.com/resource-data.htm>

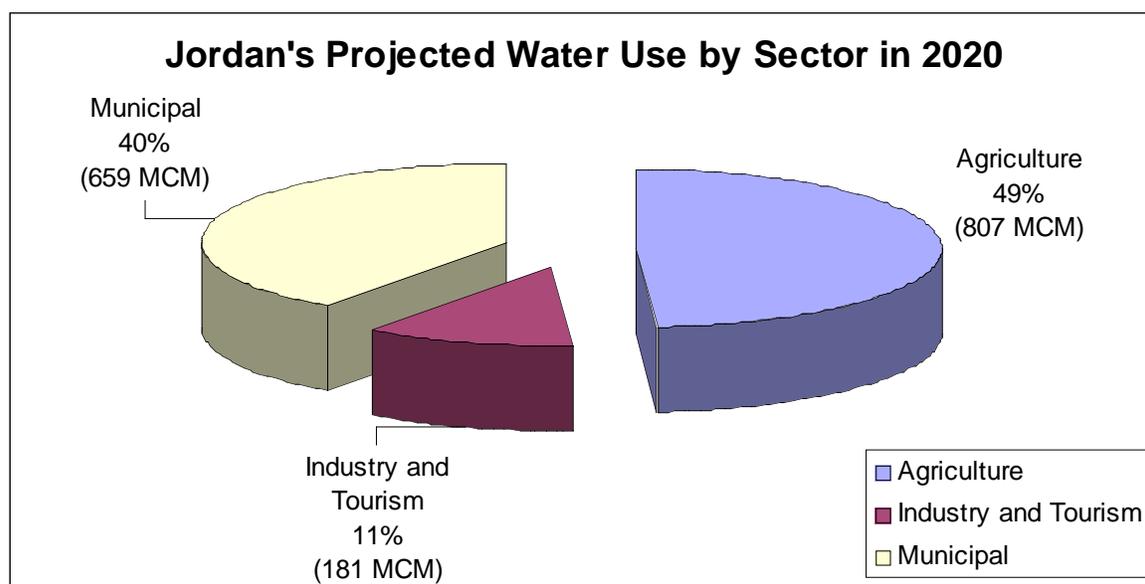
<sup>159</sup> This figure is based on published rate per cubic meter in Qualifying Industrial Zones, [www.jordaninvest.com/5a.htm](http://www.jordaninvest.com/5a.htm)

<sup>160</sup> Radwan A. Al-Weshah, "Optimal Use of Irrigation Water in the Jordan Valley: A Case Study". (Netherlands, Kluwer Academic Publishers, 2001). Pg. 337.

<sup>161</sup> Jordan Ministry of Water and Irrigation.

41-50	\$0.25
51-60	\$0.34
61-70	\$0.44
71-80	\$0.53
81-90	\$0.62
91-100	\$0.72
101-150	\$0.95
151-200	\$1.21
>201	\$1.21
<b>Jordan Valley Agriculture<sup>162</sup>(meters<sup>3</sup>)</b>	<b>Tariff (\$ per meter<sup>3</sup>)</b>
0-1000	\$0.0114
1001-2000	\$0.0171
2001-3000	\$0.0286
3001 +	\$0.0500

Projected freshwater demand in Jordan in 2020 will be 1,647 MCM according to the following breakdown by sector. If Jordan is to meet this demand, it will have to produce 360 MCM of this water by pumping down non-renewable aquifers or provide this water through an alternative source such as the Seyhan/Ceyhan pipeline.



**Source:** *The Hashemite Kingdom of Jordan Water Sector Review Update, The World Bank, February 15, 2001. Pg. 4.*<sup>163</sup>

<sup>162</sup> Jordan Valley Authority, 2002.

<sup>163</sup> Data obtained for this graph is a compilation of inconsistent information from *The Hashemite Kingdom of Jordan Water Sector Review Update, The World Bank, February 15, 2001*. For example, percentages offered in the World Bank report are not consistent with numerical data. However, the percentages offered and the numerical data are very close and any errors may be the result of rounding.

The capacity of the Seyhan/Ceyhan pipeline will be about 365 MCM per year. Following are numerous scenarios as to how pipeline costs can be recovered based on distribution of water in the three largest revenue generating sectors; industry, hotels, and residential. Based on the most cost intensive projections, total O&M costs for the Seyhan/Ceyhan pipeline will be \$332.2 million in 2020 to deliver 365 MCM of water. Any effective cost recovery scenario should generate at least this much revenue.

Tariff levels in the industrial sector are about \$2.00 per cubic meter. Therefore, allocating all of the water imported through the Seyhan/Ceyhan Pipeline to the industrial sector would result in the highest returns. For example, based on a tariff of \$2.00 per cubic meter, if all 365 MCM of Seyhan/Ceyhan water were allocated to the industrial sector, Jordan's water authorities would recover \$730 million per year. If Jordan's annual water bill to Turkey is roughly \$72 million, when costs are subtracted from revenues there is a net surplus of \$657 million per year. This money could be used by Jordan to cover O&M costs, pay transit fees to Syria, and subsidize other sectors of the economy, such as agriculture, that acquire water below cost.

However, due to that fact that water distribution networks are generally configured to supply water to more than one sector of the economy at a time it is unlikely that all of the Seyhan/Ceyhan pipeline water will be allocated exclusively to the industrial sector. More importantly however, is the fact that the industrial and tourism sectors combined are only expected to require 181 MCM of water in 2020 so it would be impossible to allocate all of the pipeline's water to these sectors. Therefore, with the exception of Scenario A, all scenarios include divisions of water among several sectors.

### Scenario A

Scenario A is based on all 365 MCM of pipeline water being allocated to the residential sector.

Sector	Industry \$2.00 per m <sup>3</sup>	Hotels \$1.40 per m <sup>3</sup>	Residential \$0.87 m <sup>3</sup>	Total
<b>Volume</b>	0	0	365 MCM	365 MCM
<b>Revenue</b>	\$0.00	\$0.00	\$317.6 million	<b>\$317.6 million</b>

As the data indicates, total revenue generated by the Jordanian Government under this scenario is \$317.6 million. As the target figure for cost recovery in 2020 is between \$138.7 million (low) and \$332.2 million (high), this scenario nearly meets the financial requirement for cost effectiveness based on high construction and O&M costs.

### Scenario B

Scenario B is based on using 181 MCM of pipeline water (11% of total annual demand) to cover expected demand in the industrial and hotel sectors assuming that water use in the industrial sector will be twice that of year 2000 levels (60 MCM). The remaining water will be allocated to the residential sector.

<b>Sector</b>	<b>Industry \$2.00 per m<sup>3</sup></b>	<b>Hotels \$1.40 per m<sup>3</sup></b>	<b>Residential \$0.87 m<sup>3</sup></b>	<b>Total</b>
<b>Volume</b>	120 MCM	61 MCM	184 MCM	365 MCM
<b>Revenue</b>	\$240 million	\$85.4 million	\$160.1 million	<b>\$485.5 million</b>

Total revenue generated under this scenario indicates that it meets the requirement for cost effectiveness.

### **Scenario C**

Scenario C is based on dividing 11% of Jordan's total water use (181 MCM) between the industrial and hotel sectors to accommodate for an increase in water use in the hotel sector with use in the industrial sector remaining equal to year 2000 levels. The remaining water would be allocated to the residential sector.

<b>Sector</b>	<b>Industry \$2.00 per m<sup>3</sup></b>	<b>Hotels \$1.40 per m<sup>3</sup></b>	<b>Residential \$0.87 m<sup>3</sup></b>	<b>Total</b>
<b>Volume</b>	60 MCM	121 MCM	184 MCM	365 MCM
<b>Revenue</b>	\$120 million	\$169.4 million	\$160.1 million	<b>\$449.5 million</b>

Total revenue generated under this scenario indicates that it meets the requirement for cost effectiveness.

### **Scenario D**

Scenario D is based on dividing 11% of Jordan's total water use (181 MCM) between the industrial and hotel sectors to accommodate a 50% increase in industrial sector water use over year 2000 levels. The remaining water is allocated to the hotel and residential sectors.

<b>Sector</b>	<b>Industry \$2.00 per m<sup>3</sup></b>	<b>Hotels \$1.40 per m<sup>3</sup></b>	<b>Residential \$0.87 m<sup>3</sup></b>	<b>Total</b>
<b>Volume</b>	90 MCM	91 MCM	184 MCM	365 MCM
<b>Revenue</b>	\$180 million	\$127.4 million	\$160.1 million	<b>\$467.5 million</b>

Total revenue generated under this scenario indicates that it meets the requirement for cost effectiveness.

As scenarios B, C, and D indicate, there are numerous ways in which Jordan could recover costs and even profit on the operation of the Seyhan/Ceyhan pipeline. The key to making this occur is an enforceable tariff collection mechanism.

### **Revenue Collection:**

The WAJ is operating at a loss every year. According to projections by the World Bank, losses are expected to diminish in coming years, but the overall deficit of the WAJ will continue to rise. In order for the WAJ to recover costs on the operation of the

Seyhan/Ceyhan pipeline the Government of Jordan must ensure that it can collect tariffs on all of the water it delivers.

As mentioned, in 1995 the World Bank conducted a limited survey of water consumers in the Amman area in order to gather data on consumer perceptions and attitudes concerning water use. Based on the results of the survey, the WAJ can build a strategy for ensuring consistent revenue collection. The results of this survey indicated the following;<sup>164</sup>

- Every household polled in the survey had at least one roof tank to collect water for use when it was not being pumped from the city. This allowed for *de facto* 24 hour water service.
- 35-45% of households surveyed had a good idea of how much water they used per day.
- A high percentage of water consumers were aware of Amman's water shortage and over 70% of those polled could describe a T.V. advertisement about conserving water.
- Over 80% of those polled remembered how much their previous water bill was.
- The three areas that consumers singled out for improvement in water service were "Cleaner Water", "24 hour service", and "Lower Price".
- A significant portion of consumers supplement their water consumption with the purchase of more expensive bottled water.

The results of the survey indicate that most consumers understand that Amman is facing a water crisis and that steps are being taken to encourage consumers to limit use. Despite this, consumers are interested in maintaining access to clean water 24 hours per day and they are willing to pay higher prices for bottled water to supplement their water supply.

By implementing the Seyhan/Ceyhan pipeline, the WAJ will have the ability to meet all of the needs articulated by those polled in the water survey. River water is generally cleaner than groundwater and the Seyhan/Ceyhan pipeline will deliver adequate quantities of clean water. Once the infrastructure in the Amman area is replaced, the reliability of water delivery will increase as well, and 24 hour per day service will be a possibility. The combination of clean, consistently available water should raise the willingness of customers to pay for water service. This will increase revenues to the WAJ and increase Jordanians confidence in the institutions managing the country's water resources.

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<sup>164</sup> The World Bank, *The Hashemite Kingdom of Jordan Water Sector Review, Vol. II, Annexes C-N, October 15, 1997. Annex K. Pg. 1-2.*

## POLICY ANALYSIS

This section will analyze issues raised in the section on Policy Background. As mentioned, these issues are the following:

### Jordan

**Policy Issue:** Should Jordan pursue a policy of acquiring water from outside its borders? This raises two subsequent issues; dependence on a foreign source for water, and the security of the pipeline so as to ensure the delivery of water.

**Policy Issue:** Should Jordan allocate a portion of the water gained from the Seyhan/Ceyhan pipeline to the agriculture sector?

**Policy Issue:** How can Jordan recover costs on water delivered from the Seyhan/Ceyhan pipeline in order to make it financially viable?

### Turkey

**Policy Issue:** Should Turkey construct facilities on the Seyhan and Ceyhan Rivers that can support a pipeline that may have environmental and political consequences at home?

### Syria

**Policy Issue:** Should Syria host the Seyhan/Ceyhan pipeline given its current dispute with Turkey over the Euphrates River and the potential environmental and social impacts the pipeline could have at home?

**Policy Issue:** If the Seyhan/Ceyhan pipeline is built, should Syria seek to acquire some of its water for use in Aleppo and Damascus?

### Jordan

Jordan's future economic and social development is contingent upon adequate supplies of freshwater. As mentioned, Jordan is designing its national industrial strategy around water and its availability.<sup>165</sup> The Jordanian leadership must weigh the benefits and drawbacks of relying on Turkey and Syria for a portion of their freshwater. Opponents of the pipeline will likely claim that relying on Turkey and Syria for Jordan's water is too risky given the realities of Middle East politics. These people will likely propose massive desalination projects that are cost intensive and leave no room for regional cooperation, an element that King Hussein and now, King Abdullah II, view as in Jordan's best interest economically and politically. At the macro level, the Seyhan/Ceyhan pipeline is an opportunity to strengthen commercial and political ties between Jordan, Syria, and Turkey. Regardless of the benefits and drawbacks, the Jordanian

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<sup>165</sup> Jordan Times, 27 November 2002.

leadership will need to convince key decision makers and the public of the need for the pipeline and the long-term gains, both in Jordan, and regionally that could result from it.

### **Pipeline Security:**

Threats to the Seyhan/Ceyhan pipeline could include; efforts by those opposed to either the Turkish, Syrian or Jordanian governments to destroy a portion of the pipeline or a related facility, attempts to poison the water of the pipeline, or efforts to divert water from the pipeline for personal use as is currently done in parts of Jordan where access to water is difficult or expensive.

Groups such as the PKK in Turkey, the Islamic Brotherhood in Syria, and numerous Palestinian liberation groups operating in Jordan could be threats to pipeline security. If the pipeline eventually had a branch servicing Israel these security concerns would become even more acute. Those in opposition to Israel, despite its current cooperation with Turkey and Jordan, might try to damage the pipeline in an effort to negatively affect the supply of water reaching Israel.

One way to further secure the pipeline is to place it underground as is being done with a large portion of the enormous “Great Man-Made River” project in Libya that will supply northern Libya with freshwater extracted from aquifers in the south. Other ways to enhance security are to monitor the pipeline system either manually or electronically. Placing the pipeline underground or implementing one of the other security measures would likely increase costs.

### **Cost Recovery in Jordan:**

Jordan must deal with the issue of cost recovery on water in all sectors of the economy if the Seyhan/Ceyhan pipeline or an alternative is to be built and commercially viable. Currently, the Jordan Valley Authority, which is responsible for water use in the agriculturally intensive Jordan Valley, and the Water Authority of Jordan, which is responsible for municipal and industrial water use in the greater Amman area, are operating at a loss. This pattern cannot continue if the pipeline is to be built.

In a best case scenario, water from the Seyhan/Ceyhan pipeline will be allocated to all sectors of the economy *with the exception* of the agriculture sector. This is in order to maximize returns both economically and financially on each cubic meter of water used as returns in the agriculture sector are the *least* compared to other sectors per cubic meter delivered. However, it is not realistic to assume that every cubic meter of pipeline water will be used in sectors other than agriculture unless the municipal water system in the greater Amman area contains a distribution mechanism to differentiate between sectors. If the pipeline is built, efforts must be made to route most, if not all of its water away from the agriculture sector and into the primary pipe system that provides water to municipal areas. This may be feasible in the future as the water infrastructure in Amman is currently being renovated.

In conjunction with a 1999 World Bank loan to Jordan, efforts are being taken to maximize returns in the agriculture sector and to return the Jordan Valley Authority to financial stability. Water in Jordan's agriculture sector is currently delivered at below cost. While this is a common practice, particularly in heavily agrarian societies, the Jordanian leadership must consider ways to either segregate the pipeline water from sectors of the economy (mainly agriculture) that do not offer returns sufficient enough to cover the cost of water delivery, or consider raising tariffs on these sectors. Raising tariffs could result in lower consumption, often referred to as "demand management", but with average consumption already incredibly low in Jordan this may be an impossible alternative. With substantial political support for the ruling family resting in the rural Bedouins and farmers, limiting or charging higher rates for water in the agriculture sector could result in a serious political backlash. This issue is currently being dealt with by the JVA in order to recover some of the costs of water used in the agriculture sector, but it will likely remain a contentious political issue.

Efforts at ensuring cost recovery in the WAJ began in 1997 are ongoing. A revised tariff structure, as seen in the sections on Commercial Background and Analysis, coupled with improved water service and cleanliness will result in higher revenues gained from water tariffs and the financial sustainability of the WAJ. Policy makers must stay committed to ensuring that collection measures are implemented and enforced in order to maintain the financial viability of the water sector in the future. Without this commitment, the water sector will continue to lose money annually regardless of the presence of Turkish water in the system.

### **Turkey**

The environmental impact the pipeline would have in Turkey is difficult to determine and would have to be assessed as part of a feasibility study. In the absence of such a study, however, it can be assumed that there would be some type of impact on the Seyhan and Ceyhan Rivers as well as the downstream environment. In terms of water loss, the combined average annual flow of these two rivers is 15.19 billion cubic meters. A portion of this water is utilized along the course of the rivers while the rest drains into the Mediterranean Sea.<sup>166</sup> The proposed pipeline would use only 365 MCM of this water annually, or roughly 3% of the total annual flow. As with the facility on the Manavgat River in Turkey, a pipeline system on these rivers would likely provide jobs, investment and a boost to the local economy.

### **Syria**

Syria has recently made a concerted effort to reach out to Turkey in a number of areas which are presented in detail in the sections on Political Background and Political Analysis. The complex issue regarding the allocation of Euphrates River water has been at the center of Syria-Turkey relations for decades. Progress has been made in recent

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<sup>166</sup> Mehmet Tomanbay, "Turkey's Approach to Utilization of the Euphrates and Tigris Rivers" *Middle East Quarterly* Volume 22, Number 2, Spring 2000. Pg. 85. Actual data from State Hydraulic Works, *Turkey's Hydroelectric Energy Potential and Current Situation*. Ankara 1998.

years on this issue with some type of an agreement reached in 2001. As the details of this agreement were not made public, it can only be speculated as to whether or not the two sides reached a final or broad settlement on the Euphrates.

Syria should consider whether or not it should press for a final or broader agreement concerning the Euphrates prior to allowing Turkey transit rights for the Seyhan/Ceyhan pipeline. As Turkey's ability to export water to Jordan via pipeline is wholly dependent on Syrian cooperation, Syria could stipulate an agreement on the waters of the Euphrates prior to the start of construction. As Turkey has the potential to gain millions of dollars in annual revenue through exporting water to Jordan this could be an incentive for Turkey to reach an agreement with Syria.

The converse may be true as well. The Syrian cities of Aleppo and Damascus are experiencing water shortages of their own and the Seyhan/Ceyhan pipeline could deliver substantial quantities of water to these cities. The Syrian leadership should consider ways to benefit from the waters of the pipeline and understand that efforts to gain water from the pipeline could have a negative effect on an overall settlement on the Euphrates, particularly if Syria is desperate for water. For example, if Syria indicated a keen interest in the construction of a pipeline to augment its own water supplies, Turkey might sense that Syria desperately needs water and would thus have a strong bargaining position over any settlement on the Euphrates. As a result, Turkey could condition cooperation on the pipeline with Syria lowering its demands for water from the Euphrates. This additional leverage would be in addition to the near monopoly on power Turkey already enjoys regarding this river.

### **Environmental and Commercial Issues:**

As in the case of Turkey, the environmental impact the pipeline would have in Syria is difficult to determine and would have to be assessed as part of a feasibility study. In the absence of such a study, however, it can be assumed that there would be significant impact on the route of the pipeline unless the construction company installing the pipeline takes care to limit these effects. These impacts would be different depending on whether or not the pipeline was installed above or below ground.

Syria would benefit commercially from the pipeline as the majority of it would be built on Syrian territory, bringing foreign direct investment, technology, and jobs to the country. Labor could be provided by Syria in addition to long-run engineering and hydrology expertise. These services could be funded by transit fees collected from Jordan.

## POLITICAL ANALYSIS

### Turkey

The construction of the Manavgat water processing and export facility and Turkey's recent water deal with Israel are clear indicators that Turkey is willing to sell its excess water for profit. It has been reported that Turkey is looking for more buyers, namely Malta, Cyprus, Crete, and Jordan and is considering selling water to its own city of Istanbul.<sup>167</sup> The sale of bulk water from Turkey is clearly feasible, and the most efficient way to transport this water to Jordan, or any other Middle Eastern country, is via a transnational pipeline. As the countries that might be interested in Turkey's water are located to the south, any pipeline scheme would likely require the cooperation of Syria and Jordan.<sup>168</sup>

While the GAP project could benefit Turkey's economy, particularly the poorer southeastern region, downstream neighbors Syria and Iraq fear that Turkey's water policies will have a negative impact on their own economies due to restricted access to water. Without a comprehensive water treaty between all three Euphrates riparians (Turkey, Syria and Iraq) that delineates who gets what percentage of Tigris and Euphrates waters, downstream actors are left with little option but to let the status quo prevail, negotiate for their water needs, or use force to return the flow of the Tigris and Euphrates Rivers to their pre-GAP levels.

The cooperation of Syria is crucial if the Seyhan/Ceyhan pipeline is to be built due to the fact that the pipeline will have to traverse Syrian territory.<sup>169</sup> Therefore, Syria holds the most power in the initiation of a pipeline scheme. This issue will be explained in greater detail in the Political Analysis section on Syria.

### Jordan

To date, Jordan has not followed through on previous overtures regarding the acquisition of water from Turkey, but there is no evidence to indicate that Jordan is not still interested. Given both former King Hussein's and reigning King Abdullah's understanding of the water crisis in the region, it is likely that Jordan would be in favor of a comprehensive regional water sharing agreement that could involve water from Turkey.

Transportation and delivery of Turkish water to Jordan, while technically and economically feasible, is complicated due to Jordan's geographic location and political

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<sup>167</sup> Anthony LoBaido, "Israel plans water pipeline from Turkey", *WorldNetDaily.com*, 12 April 2001.

<sup>168</sup> Iraq borders Turkey to the southeast and could potentially host a transnational water pipeline, however the majority of countries that have shown at least some interest in Turkey's water make a route through Syria more direct, and therefore, more cost efficient.

<sup>169</sup> While this is true of overland pipelines, there is the possibility of exporting Turkish water to countries south of Syria via an underwater pipeline. One proposal put forth envisions a pipeline originating in Manavgat, Turkey and terminating in Israel via northern Cyprus. While this pipeline has not been built, and likely will not be in the near future, the proposal demonstrates a creative way for Turkey to bypass uncooperative countries en route to the pipeline's final destination.

relationships with its neighbors, namely Israel and Syria. There are two likely options for the delivery of Turkish water to Jordan: via pipeline or tanker truck through Israel, or via overland pipeline through Syria. Delivering Turkish water to Jordan via Israel by tanker trucks has been deemed too expensive, and a pipeline currently does not exist to make the second option a reality. If a pipeline transiting Israel were constructed, Jordan's water supply would be contingent upon the goodwill of Israel, with whom it signed a peace treaty in 1994. Conversely, due to common economic and political interests, a shared Arab identity, and a dramatic improvement in relations between Jordan and Syria since 1999, the political environment between these two countries appears capable of supporting the Seyhan/Ceyhan pipeline.

### **Water Transfer Involving Israel:**

If Jordan and Israel reach an agreement permitting the transfer of Turkish water to Jordan by way of Israel, Jordan will be completely dependent upon Israel to permit water transfers uninterrupted. Due to Israel's own desperate water situation, and given the current tensions between Israelis and Palestinians, Jordan will likely not take that risk. Despite the peace treaty of 1994, there is still the potential for relations between Israel and Jordan to sour. Additionally, due to simple geography and the political realities of the region, there are too many opportunities for Israel to manipulate the water situation to pressure Jordan into acting according to its interests.

For example, Israel could condition the transfer of water to Jordan on Jordan's behavior vis-à-vis Syria. Israel could pressure Jordan into limiting trade with Syria, with whom they signed a free trade agreement in 2001, in an effort to pressure Syria into resuming peace talks over the Golan Heights. Prior to the fall of Saddam Hussein in Iraq another scenario could have entailed Israel threatening to cut off Jordan's water if Jordan continues trading with Iraq, Jordan's number one regional trading partner. Additionally, Jordan's economy is highly dependent on large quantities of discounted Iraqi oil that it receives despite sanctions imposed on Iraq following the Gulf War of 1991. The coming months and years will be critical as changes in Iraq will have a direct impact on Jordan's political and economic arenas. With pending changes in the Middle East aside, scenarios in which Jordan is pressured into changing behavior based on Israel's demands make Jordanian dependence on Israel for Turkish water extremely unattractive and the Seyhan/Ceyhan Pipeline a more politically viable alternative.

### **An Improving Jordan-Syria Relationship from the Jordanian Perspective:**

In August of 2001 steps toward further strengthening relations between Syria and Jordan were taken when Syrian authorities permitted the circulation of independent Jordanian newspapers on the highly controlled Syrian market for the first time in 20 years. Prior to this, only one Jordanian newspaper was permitted in Syria as its ideology was in line with those of former Egyptian president and pan-Arab proponent Gamal Abdul-Nasser. The opening of the Syrian newspaper markets was preceded by a similar step taken by the Jordanian government to allow the circulation of Syrian papers in its country.<sup>170</sup>

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<sup>170</sup> "Syria permits the circulation of Jordanian papers", *Arabic News.com*, 8 August 2001.

Overtures such as this are small steps in a larger effort to further integrate the two countries socially and economically.

### Syria

In recent years, Syria's government, lead by the young Bashar al-Assad, has gone to great lengths to improve Syria-Turkey relations, however the two countries have a long history of tension. Consistently complicating matters between Syria and Turkey is Syria's outrage at Turkey over its limiting the flow of desperately needed Euphrates water. At one point, in early 1990, Turkey reduced the flow of the Euphrates to a trickle for an entire month to fill the catchment area behind the recently completed Ataturk Dam.

In February 1996, Turkey and Israel signed a bilateral military accord that the Syrian Defense Minister, Mustapha Tlass, referred to as a "satanic" alliance.<sup>171</sup> Syria, becoming increasingly isolated politically, feared that the combination of a Jordan-Israel peace and a Turkish-Israeli military alliance would put them in a vulnerable position both politically and militarily.

In 1998 relations between Syria and Turkey hit a low-point. At this time, the two sides nearly went to war with each other over Syria's support for Abdulah Ocalan, then leader of the PKK, a Kurdish separatist group seeking independence for Kurds living in southeast Turkey. In October of that same year, tensions escalated to the point that the Chief of Turkey's General Staff was quoted as saying that an "undeclared state of war" exists between Turkey and Syria largely due to the issue of the PKK. Further reports by the Turkish press indicated that Turkish troops were being sent to the Syrian border, and Turkish Prime Minister, Mesut Yilmaz, warned Syria that the Turkish army was "awaiting orders" to attack.<sup>172</sup> The threat of hostilities persisted and Egyptian President Hosni Mubarak was called upon to intervene. Tensions were finally diffused after the governments of Ankara and Damascus signed an accord mediated by Egyptian and Iranian diplomats. Although war was averted, and Abdulah Ocalan was eventually expelled from Syria and arrested, tensions over water persisted and continue to remain a central issue of dispute between the two countries.

#### **Benefits of Hosting the Pipeline:**

Turkey's GAP project could further exacerbate tensions between Turkey and Syria. And although Syria was included in the initial peace pipeline proposal in 1987 as a transit country and beneficiary of water, any water agreement involving Turkey may be viewed with skepticism by Syria due to past restrictions imposed by Turkey on Euphrates water. However, permitting the Seyhan/Ceyhan Pipeline to transit Syrian territory could result in the following direct benefits to Syria;

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<sup>171</sup> "Turkish PM warns Syria that Army awaiting orders", *AFP*, Ankara, 3 October 1998.

<sup>172</sup> "Turkey in undeclared state of war with Syria, top commander says", *AFP* Ankara, 2 October 1998, and "Turkish PM warns Syria that Army awaiting orders", 3 October 1998.

- Employment opportunities for Syrians at pumping stations and with contractors performing routine maintenance on the system.
- Foreign Direct Investment brought by construction contracts and related services.
- A source of revenue in the form of transit fees.
- Stronger economic relations with both Turkey and Jordan which could translate into stronger political relations between the three countries.
- A source of water for the cities of Aleppo and Damascus.

Syria's reluctance to hosting a water pipeline would likely stem from its ongoing dispute with Turkey over the Euphrates. It would be ironic for Syria to host a pipeline carrying Turkish water for profit, albeit from rivers other than the Euphrates, when one of the main points of contention between Turkey and Syria continues to be water. Syria might not be willing to allow the Seyhan/Ceyhan pipeline to transit its territory simply because of the precedent it might set. If the pipeline were constructed Turkey may contend in the coming years that if Syria wants Turkish water, whether from the Euphrates or any other source, it can buy it just like Israel and Jordan. While it is illegal for a country to sell water to a downstream riparian from a river that is shared by the two, there is no guarantee that Turkey would not further reduce the flow of the Euphrates to force Syria into purchasing pipeline water. Syria's acceptance of the Seyhan/Ceyhan pipeline would likely be contingent upon explicit language embodied in a transit agreement stating that it is acting merely as a conduit for the transit of Turkish water to Jordan and that the presence of Turkish water in Syria as a result of the pipeline has no bearing on the amount of water Turkey is obligated to provide Syria via the Euphrates River.

Despite a strained past, Turkey - Syria relations began to improve in 2000 with the change of leadership in Syria and the visit of Turkey's President to Damascus for the funeral of Hafez Al-Assad. The signing of two military cooperation agreements between Turkey and Syria led Turkey's Chief of Staff to remark that "A new era will be opened in the relations between Turkey and Syria with military cooperation".<sup>173</sup> This is likely to prove true as the two military agreements between Turkey and Syria indicate a delinkage of the Euphrates issue from other interests. Great strides to mend relations have been taken by both sides and the fact that Syria's young president cannot afford to isolate Syria in the same way his father did for so many years may lead to even greater efforts to engage Turkey in the future. In addition, President Assad has enacted measures to boost trade with neighbors including the previously mentioned free trade agreement with Jordan and a free trade agreement with Iraq.

### **An Improvement in Syria and Jordan Relations from the Syrian Perspective:**

By signing the 1994 Peace Treaty with Israel, the bargaining positions of Syria and Lebanon in the face of Israel were weakened as the unified front of Jordan, Syria and Lebanon had now been split. This led to a strain in relations between King Hussein and Hafez Al-Assad. Relations began to improve in 1999 immediately following the death of King Hussein, Jordan's monarch for 46 years. President Assad of Syria, who had not set foot in Jordan for five years, made a surprise showing at King Hussein's funeral, opening

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<sup>173</sup> Nicholas Blanford, "Syria forms new alliances", *The Christian Science Monitor*, 26 June 2002.

the door to a new era in Syria-Jordan relations.<sup>174</sup> Additionally, Bashar al-Assad, the heir apparent to his father in Syria, was placed in charge of the Jordan file roughly a year prior to his father's death, an indication of the importance relations between the two countries would play after the elder Assad's passing.<sup>175</sup>

After the death of King Hussein, Jordan's new king, Abdullah, visited Syria just two months after ascending to the throne. During his highly publicized visit to Damascus, Syrian President Hafez al-Assad told King Abdullah that he was opening a "new chapter" between the two countries.<sup>176</sup> Issues that were immediately addressed included economic cooperation and water. An area of dispute between the two countries has been the management of the Yarmouk River which originates in Syria, crosses into Jordan, and empties into the Jordan River. Syria has built numerous dams on its upstream portion of the river to the detriment of Jordan.

In the past two years, relations between the two countries have improved to the point that a free-trade agreement was signed in 2001 and construction has begun on the \$136 million al-Wihdeh dam on the Yarmouk River. The al-Wihdeh dam will stop the flow of a portion of the Yarmouk River on the Jordan-Syria border and store up to 110 MCM of water, 50 MCM/yr of which will be allocated for domestic use while 20 MCM will be allocated to irrigation. As previously agreed, Syria will not have access to any of the water resulting from this project as Jordan is paying for the construction of the dam in its entirety and Syria does not rely as heavily as Jordan on water from the Yarmouk River.<sup>177</sup>

Due to common economic and political interests, a shared Arab identity, and a dramatic improvement in relations between Jordan and Syria since 1999, the political environment appears capable of supporting the Seyhan/Ceyhan Pipeline project. In light of this political background, following are four hypothetical scenarios that could occur concerning Syria and a proposal to build the Seyhan/Ceyhan pipeline:

#### **Scenario #1:**

*Syria does not support* the Seyhan/Ceyhan pipeline due to its ongoing dispute with Turkey over the Euphrates River. Allowing the pipeline to transit Syria might be seen as a contradictory position in light of the ongoing dispute over the waters of the Euphrates. It is impossible to know how realistic this scenario might be because details of the 2001 Syria-Turkey agreement concerning the waters of the Euphrates are not public.

#### **Scenario #2:**

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<sup>174</sup> Caroline Faraj, "King begins 'historic' visit to Syria today", *Jordan Times*, 12 April 1999.

<sup>175</sup> Ibid.

<sup>176</sup> Abdullah Hasanat, "King holds 'positive' talks with Assad. Landmark visit opens 'new chapter' in Jordan-Syrian relations – Syrian president", *Jordan Times*, 22 April 1999.

<sup>177</sup> "Turkish company wins water pipeline contract", *Jordan Times*, 30 July 2002.

Syria *supports* the Seyhan/Ceyhan pipeline if a long-term agreement is made concerning the waters of the Euphrates that Syria determines is acceptable. As in the case of scenario #1, this scenario is dependent on details of the 2001 Syria-Turkey agreement concerning the waters of the Euphrates that are not public.

**Scenario #3:**

Syria *supports* the Seyhan/Ceyhan pipeline despite a long-term agreement on the waters of the Euphrates due to the political and commercial benefits that it would bring to Syria. This scenario would likely be based on an understanding between the two sides that the construction of the pipeline and transit of water from Turkey to Jordan through Syria has no bearing on the separate issue of the dispute over the waters of the Euphrates. This linkage of issues would protect Syria's long-term interest in the waters of the Euphrates. As in the case of scenarios #1 and #2, this scenario is dependent on details of the 2001 Syria-Turkey agreement concerning the waters of the Euphrates that are not public.

**Scenario #4:**

Syria *supports* the Seyhan/Ceyhan pipeline and does not link the issue of the waters of the Euphrates to the pipeline. This could occur if Syria determines the political and commercial benefits of hosting the pipeline outweigh any further gains that it may achieve on the issue of the Euphrates. This de-linkage, however, could possibly give Turkey additional leverage over Syria regarding the Euphrates issue. As in the case of scenarios #1, #2, and #3, this scenario is dependent on details of the 2001 Syria-Turkey agreement concerning the waters of the Euphrates that are not public.

## **POLITICAL ANALYSIS OF OTHER REGIONAL ACTORS**

### **Lebanon**

Lebanon is heavily influenced politically by Syria. The relationship between the governments of Beirut and Damascus is so close that the countries don't have embassies in each country's respective capitals. As Lebanon is not a water-stressed country and is heavily influenced by Syria, Lebanon will probably not oppose the Seyhan/Ceyhan pipeline unless Syria does. Lebanon would probably be outwardly supportive if the pipeline were to supply water to Israel in the future via a branch from Jordan as it would lessen Israel's dependency on water originating in the Wassani Springs and Hasbani River.<sup>178</sup> As previously mentioned, Israel has threatened recently to destroy a Lebanese built diversion facility at the Wassani Springs which feed the Hasbani River. If Israel's water needs are met by the Seyhan/Ceyhan pipeline it would, in theory, have no need for Jordan River water originating from either the Wassani Springs or Hasbani River. Lebanon would then be able to further utilize the waters of the Wassani Springs and Hasbani River for the development of southern Lebanon.

### **Palestine**

As in the case of Syria, although the proposed Seyhan/Ceyhan pipeline would initially be built to meet Jordan's water needs, the Occupied Territories could benefit from an additional source of water. The Palestinian Authority would likely support the construction of the pipeline knowing that it may gain future access to its water. Alleviating Jordan's water debt with Turkish water could also free-up water for Palestinians that Jordan currently takes from the Jordan River. However, there is the very real possibility that any reduction in the utilization of Jordan River water by Jordan will be negated by Israel's increased use of these same waters as Israel controls several points of extraction as well as distribution systems throughout the West Bank.

As long as the West Bank remains under occupation Palestinians will not likely have access to water from the Seyhan/Ceyhan pipeline without Israel enjoying the same privilege. Israel would simply not allow Palestinian access to pipeline water given their own shortage, particularly if the water delivered from Turkey is of higher quality than that being drawn out of the Mountain and Coastal Aquifers. Therefore, the best scenario for Palestine to benefit from water piped from Turkey entails independence being gained and an arrangement made with Jordan for a portion of piped Turkish water. In the case of an independent Palestine, water could be piped directly from Jordan to territory under Palestinian control. In this scenario, Israel could be excluded from access to pipeline water for reasons of Palestinian territorial sovereignty.

### **Israel**

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<sup>178</sup> For more on the dispute over the Wassani Springs and the Hasbani River see the analysis of Israel later in this section.

Israel's contract for Turkish water is a clear indicator that Israel's water policy includes supplementing its domestic water supply with bulk water from sources outside of its sovereign control. Although not a simple "water for weapons" exchange, Israel's purchase of Turkish water, and Turkey's purchase of Israeli military equipment further strengthens a growing bond between the two countries, a bond that is making neighbors in the region, particularly Syria, nervous.

Regarding Lebanon, it is debatable whether or not Israel would actually launch air strikes against the Wazzani Springs project. It is possible that Israel's strong rhetoric is actually a warning not to build a larger dam that could significantly impact the overall flow of the Hasbani and Jordan Rivers.<sup>179</sup> However, past behavior dictates that Israel is willing to use military force to protect its sources of freshwater. As water levels continue to drop amid the pressures of increased water demand, the military option to keep water flowing into the Israeli water network might become even more attractive.

Following are four hypothetical scenarios regarding how Israel may respond to the construction of the Seyhan/Ceyhan pipeline:

**Scenario #1:**

Israel *does not support* the Seyhan/Ceyhan pipeline project as the presence of an additional source of water in the region would diminish its role as a necessary participant in a comprehensive peace settlement, a large component of which is likely to involve water currently under Israeli control. If the waters under Israel's control are replaced by Turkish water, thus meeting the other riparians water needs, there is little incentive for Syria, Lebanon, and the Palestinian Authority to make concessions on security in exchange for water. This assumes, of course, that the Seyhan/Ceyhan pipeline is expanded to supply water to Palestinians living in the West Bank. In essence, water would be removed from the security equation for all parties and weaken Israel's bargaining position the greatest.

This logic could work in reverse as well, thus benefiting Israel. If Israel maintains its control over the Sea of Galilee and the two main aquifers of the West Bank knowing that Syria, Jordan and the Occupied Territories have ample water from the Seyhan/Ceyhan pipeline, this gives them little incentive to offer land in exchange for security or water.

**Scenario #2:**

Israel *supports* the Seyhan/Ceyhan pipeline as its presence will reduce competition for scarce water resources in the Jordan River Basin. The presence of the pipeline might also weaken Syria's claim for the complete withdrawal of Israel from the Golan Heights and the recognition of the Syrian border as the shore of the Sea of Galilee. This is based on

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<sup>179</sup> Nicholas Blanford, "A Lebanese-Israeli water conflict threatens to boil over", *The Christian Science Monitor*, 21 October 2002.

the premise that, like Israel, Syria's interests in the Golan are as much territorial and security related as they are guaranteeing access to the waters of the Sea of Galilee. In reality, Syria is not dependent on the waters of the Sea of Galilee to the degree that Israel is. But the hope of Syrian's having access to the shores of the Sea of Galilee, as was the case prior to the occupation, is a powerful symbolic tool used by Damascus to maintain support at home for a full Israeli withdrawal from the Golan Heights. The presence of the pipeline would immediately diminish Syria's claim to the Sea of Galilee in order to exploit its waters.

**Scenario #3:**

Israel *supports* the Seyhan/Ceyhan pipeline as a means of additional freshwater for its domestic needs and reaches an agreement with Jordan and the Palestinian Authority to have a branch of the pipeline supply Israel proper through territory controlled by the PA. If Israel engaged Jordan and the Palestinian Authority in order to make this a reality the bargaining position of the Palestinian Authority would be greatly strengthened. Israel would have to gain the permission of the PA for the pipeline to cross their territory before reaching Israel proper. The PA could ask for land and the removal of settlements in exchange for transit rights.

**Scenario #4:**

Israel *supports* the Seyhan/Ceyhan pipeline as a means of additional freshwater for its domestic needs and reaches an agreement with Jordan, *exclusive of the PA*, to have a branch of the pipeline enter Israel. This branch could enter Israel from Jordan south of the Sea of Galilee and north of the West Bank, and then connect with the National Water Carrier. A water sharing agreement could be set up as an extension of the existing water agreement in the Israel-Jordan Peace Treaty of 1994, or a stand alone agreement could be arrived at. Either type of agreement could include a component where Israel compensates Jordan for access to and the use of pipeline water.

While this scenario meets the interests of Israel and marginalizes the PA, it is unlikely that Jordan, and particularly Syria, would agree to a pipeline scheme that deliberately bypasses the West Bank as the Palestinians are the most desperate for water among all riparians in the Jordan River Basin.

**LEGAL ANALYSIS**

This section will analyze the legal issue raised in the Legal Background section and explain their relevance to the Seyhan/Ceyhan Pipeline. Issues within the following bodies of law will be discussed; commercial, international, and international trade.

Due to the similarities in legal issues facing oil, gas, and water pipelines, the ECT is a model that could be used for the establishment of a multilateral treaty pertaining specifically to a transboundary water pipeline.<sup>180</sup> The following analysis is made with principles of the ECT in mind.

Similar to gas and oil pipelines, any legal regime developed around the Ceyhan/Seyhan Pipeline must ensure that water can transit through Syria and that Syria takes measures necessary to ensure its transit.<sup>181</sup> In order for a legal regime to be totally effective, it should be complemented by well-drafted contractual agreements between Turkey, Syria, and Jordan for the sale, purchase and transit of water. The legal regime should ensure that the flow of water is not interrupted in the event of a dispute between any of the parties involved. Strong, internationally accepted contracts will help establish legally binding obligations between parties under the auspices of international common law in the event of a dispute. Furthermore, a dispute settlement mechanism should be included in the legal regime governing the pipeline. It is worth mentioning that the ECT is the first multilateral treaty to include binding international dispute settlement as a fundamental provision.<sup>182</sup>

The Ceyhan/Seyhan Pipeline will need to encompass the following at the legal level in order to be successful:<sup>183</sup>

- A solid political framework in the form of bilateral or multilateral agreements facilitating cross-border cooperation that minimizes the risk of cross-border disputes.
- A determination as to whether each portion of pipeline in Turkey, Syria, and Jordan will be considered under the territorial jurisdiction of the state it is physically present in, and therefore subject to domestic law, or if the pipeline will be considered a “unitary whole” subject to the rules and regulations of an international legal regime agreed to by the three states.
- Adequate domestic legal regulations in Turkey, Syria, and Jordan providing for the enforceability of contracts and non-discrimination, along with regulatory authority that is free from political interference.
- Provisions for determining and securing property rights, right-of-way, ownership, tariffs and transit fees, non-diversion, notification and mitigation of the effects of interruptions in transit, and technical standards such as metering and measuring.

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<sup>180</sup> T. Elijah Ngurare, *Legal and Institutional Implications of Cross-Border Water Pipelines in International Law: The Congo Cross-Border Water Pipeline Project (CWPP) Case Study*. The Center for Energy, Petroleum and Mineral Law and Policy, United Kingdom, 2000.

<sup>181</sup> Ibid.

<sup>182</sup> Ibid.

<sup>183</sup> Ibid.

- A clear contractual framework that sets out commercial relationships between Turkey, Syria, and Jordan. This framework should address the following contractual relationships as applicable;
  - a) The country to country relationship,
  - b) The country to pipeline company relationship,
  - c) The pipeline consortium relationship, and
  - d) The pipeline company to commercial contractor relationship.

**Water is an economic good:** Those who contend that water is strictly an economic good hold that once water, whatever its source, is bottled, bagged, or put in a container for sale, it has been transformed into a good and is subject to the rules of trade per the GATT.<sup>184</sup> This perspective is supported in documents such as those that resulted from the International Conference on Water and Environment held in Dublin, Ireland in January 1992. Included in the four “Dublin Principles” is the following:

“Water has an economic value in all its competing uses and should be recognized as an economic good.”

**Water is a social good:** There is no universally accepted definition of a social good or service, and it is difficult to definitively say whether or not water qualifies as a social good. However, its availability does increase personal and social well-being and its use by one group can be detrimental to the well-being of another group if it is in short supply.<sup>185</sup> Water is often one of the first items that a community seeks to develop, even prior to electricity or sanitation.<sup>186</sup> Supplying water often demands government actions similar to those relegated to other social goods. For example, large capital intensive projects such as dams, canals, and pipelines are often not in the interest of private companies to build, however, governments realizing the social and economic benefits of a strong infrastructure will make investments accordingly if funds are available.

Water is often treated as a social good within Islam, the primary religion of Jordan, Syria and Turkey. Water is considered a blessing from God in Islam that sustains life, and purifies mankind as well as the earth. The Arabic word for water occurs frequently in the Quran and God’s throne is described as resting atop water.<sup>187</sup> Water enjoys a special place in Islam as it is used for ritual washing before prayer as well as bathing and

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<sup>184</sup> The International Conference on Water and Environment held in Dublin, Ireland in January 1992 included the following in its four “Dublin Principles”: “*Water has an economic value in all its competing uses and should be recognized as an economic good.*” A similar understanding of water as an economic good emerged from The UN Conference on Environment and Development held in Rio de Janeiro, Brazil later that year, “*Water has an economic value in all its competing uses and should be recognized as an economic good.*” Peter H. Gleick, Gary Wolff, Elizabeth L. Chalecki and Rachel Reyes, *The New Economy of Water*, The Pacific Institute, February 2002. Pg. ii and 6.

<sup>185</sup> Peter H. Gleick, Gary Wolff, Elizabeth L. Chalecki and Rachel Reyes, *The New Economy of Water*, Pacific Institute, February, 2002. Pg. 5.

<sup>186</sup> Peter H. Gleick, *The World’s Water*, (USA, Island Press, 2002). Pg 36.

<sup>187</sup> Naser I. Faruqui, Asit K. Biswas, and Murad J. Bino, *Water Management in Islam*, (USA, United Nations University Press, New York, 2001), Pg. 2.

cooking. As a result, water is generally held as a communal good throughout the Middle East although it is delivered at a price in many instances.

**Water is both an economic and a social good:** Proponents of water as both an economic and a social good contend that water has characteristics of both and can be managed by government, private institutions, or both. This point of view was recognized at the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, Brazil. Agenda 21, Chapter 18.8 that resulted from the Conference states;

“Integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource, and a social and economic good . . .”

### **The Case of GATT Article XI:**

Several provisions of the GATT raise issues relevant to the sale and export of water. GATT Article XI(1) through XI(2)(a) states:

3. No prohibitions or restrictions other than duties, taxes or other charges, whether made effective through quotas, import or export licenses or other measures, shall be instituted or maintained by any contracting party on the importation of any product of the territory of any other contracting party or on the exportation or sale for export of any product destined for the territory of any other contracting party.
4. The provisions of paragraph 1 of this Article shall not extend to the following:
  - (a) Export prohibitions or restrictions temporarily applied to prevent or relieve critical shortages of foodstuffs or other products essential to the exporting contracting party;

Given that Turkey currently exports water for profit, the language of Article XI suggests that a ban by Turkey on the export of water constitutes a violation of the GATT, unless this ban can be justified by an exception provided for somewhere else in the GATT.<sup>188</sup>

Article XI(1) and XI(2)(a) would likely only be applicable if Turkey experienced a drought and had to retain water previously destined for export for domestic purposes. A drought in Turkey, and a subsequent restriction on water exports, could have dramatic consequences for Jordan as its reliance on Turkish water will be in lieu of developing

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<sup>188</sup> Milos Barutciski and Anita Banicevic, *Water Conservation and International Trade Law: The Phantom Menace?* Prepared for CLE International Conference on Great Lakes Water Law, Milwaukee, USA, 24 and 25 February 2000 by the firm of Davies, Ward & Beck, Toronto, Canada. Pg. 8.

alternative sources of water. In essence, a drought in Turkey would translate into a drought in Jordan.

The economic and social impacts of a drought in Turkey and subsequent restrictions on water exports are unclear as water utilized from the Seyhan/Ceyhan Pipeline may not be targeted for use in just one sector of Jordanian society. It is more likely that water from the pipeline would be spread across at least two of the three – agriculture, municipal, and commercial – sectors in Jordan. In the case of the Disi-Amman conveyer, water is being developed primarily for municipal use, but a portion of this waters will be used in both the agricultural and industrial sectors. If we assume that the majority of Turkish water will be allocated to one sector more so than another, then economic impacts from a trade restriction could be more easily assessed. Although potential impacts are impossible to accurately determine, it is safe to assume that if restrictions consistent with Article XI(1) and XI(2)(a) are applied by Turkey there would have a negative impact on Jordan.

### **The Case of GATT Article XX:**

GATT Article XX(g) states:

Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures:

(g) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption;

Article XX(g) is sometimes referred to as the “green exception”. The burden of proof in any WTO case involving the application of Article XX(g) is high. In fact, to date, no WTO panel has ruled in favor of a party invoking Article XX(g) as a justification for export restrictions. The following cases are examples of how WTO panel’s have applied Article XX(g).

### **WTO Panel Rulings on Article XX(g):**

In 1987, the U.S. initiated a claim against Canada concerning restrictions on the export of salmon and herring. In *Canada-Measures Affecting Exports of Unprocessed Herring and Salmon* it was ruled that Canada’s prohibitions on the export of unprocessed herring and salmon were unjustified despite Canada’s claim under Article XX(g) that it was protecting fish stocks. It was ruled that Canada’s export restrictions were not aimed at preserving fish, but rather aimed at preserving a domestic seafood processing industry.

Subsequent cases involving Article XX(g) have resulted in similar decisions. In 1996, Venezuela and Brazil brought a complaint against the U.S. in *United States – Standards*

for *Reformulated and Conventional Gasoline* claiming that “baselines” for levels of specific contaminants per the U.S. Clean Air Act were being applied to foreign produced gasoline in a discriminating manner. Although the basis for the import restriction was an environmentally based provision articulated in the Clean Air Act, it was ruled that the U.S. measure, while not in explicit violation of Article XX(g), was in violation of the chapeau of Article XX. The chapeau was written with the intent of preventing contracting parties from using the broad exceptions in the Article for protectionist or discriminatory purposes.<sup>189</sup> In the end, the panel ruled that U.S. gasoline regulations were implemented in a way that constituted “unjustifiable discrimination” and a “disguised restriction on international trade”.<sup>190</sup>

Although, to date, there has not been a panel ruling in favor of parties invoking Article XX(g) in their defense, panels have not been unsympathetic to the environmental motive that is written into Article XX(g). Rather, panels have refused to allow defending parties to use Article XX(g) as an excuse to defend specific economic interests and, likewise, have not permitted parties to defend arbitrary conduct by invoking Article XX(g) simply because that conduct was carried out in the *context* of an environmental or conservation measure.<sup>191</sup> Panels have been very careful to ensure that restrictions, both export and import, are truly based on the intent of the chapeau of Article XX as well as Article XX’s specific exceptions such as the conservation of exhaustible natural resources. The ruling in the U.S.-Malaysia Turtle/Shrimp case articulates this point well.

In the 1998 case, *United States - Import Prohibitions of Certain Shrimp and Shrimp Products*, Malaysia brought the U.S. before a WTO panel regarding U.S. import restrictions on the import of shrimp caught by means that endangered the lives of sea turtles. The panel ruled that U.S. measures imposed on the import of shrimp qualified for provisional justification under Article XX(g), however, the case was lost due to the fact that the U.S. applied its shrimp import restrictions differently to different countries without reasonable justification and in violation of the chapeau of Article XX. This constituted “arbitrary and unjustifiable discrimination between Members of the WTO, . . .”<sup>192</sup>

Despite this judgment, the panel stated the following in paragraph 43 of their ruling,

“In reaching these conclusions, we wish to underscore what we have *not* decided in this appeal. We have *not* decided that the protection and

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<sup>189</sup> Milos Barutciski and Anita Banicevic, *Water Conservation and International Trade Law: The Phantom Menace?* Prepared for CLE International Conference on Great Lakes Water Law, Milwaukee, USA, February 24 and 25, 2000 by the firm of Davies, Ward & Beck, Toronto, Canada. Pg. 9.

<sup>190</sup> Ibid. Pg. 20.

<sup>191</sup> Ibid. Pg. 15.

<sup>192</sup> Ibid. Pg. 21.

preservation of the environment is of no significance to the Members of the WTO. Clearly it is. We have *not* decided that the sovereign nations that are Members of the WTO cannot adopt effective measures to protect endangered species, such as sea turtles. Clearly, they can and should. And we have *not* decided that sovereign states should not act together bilaterally, plurilaterally or multilaterally, either within the WTO or other international fora, to protect endangered species or to otherwise protect the environment. Clearly, they should and do.”<sup>193</sup>

In light of the precedent that has been set, two potential scenarios applicable to the Seyhan/Ceyhan Pipeline emerge:

First, do prior rulings against parties that have invoked Articles XI(1), XI(2)(a), and XX(g) in their defense mean that Turkey will not be able to invoke either of these Articles in the case of a drought or an unforeseen need to preserve the waters of the Seyhan and Ceyhan Rivers?

In order for Turkey to have a strong case under Article XI(1) and XI(2)(a), it must demonstrate that it truly is suffering from a critical shortage of water. Likewise, in order to effectively apply Article XX(g) Turkey must clearly demonstrate that restrictions on water exports are being made “in conjunction with restrictions on domestic production or consumption”. This means that if Turkey imposes a restriction on the export of freshwater to Jordan, or any other contracting party, it can only be justified if similar or reciprocal restrictions are placed on the domestic consumption of freshwater.

Furthermore, Turkey cannot arbitrarily decide to stop exporting freshwater without justification under the GATT. Essentially, once the tap has been turned on, it cannot be turned off except under legally acceptable circumstances.

Second, based on prior rulings against parties who have invoked Article XX(g), is Jordan guaranteed a ruling in its favor if Turkey imposes restrictions on the flow of water to Jordan and invokes Article XX(g) in its defense?

No. Although panels have not yet upheld an Article XX(g) claim, it is clear in each case that this is because parties have tried to use Article XX(g) to protect an explicit economic interest rather than an explicit, exhaustible natural resource. Jordan, or any other WTO member, is never guaranteed a victory simply because the circumstances of their case are similar to cases before it. It is entirely possible that Turkey could justly defend its right to restrict the export of freshwater if it meets the necessary legal criteria.

### **Water, Article XX(g), and the Lack of Precedent:**

No WTO panel has heard a case where Article XX(g) was invoked in defense of the preservation of water, therefore it is unclear how the term “exhaustible” would be interpreted by a panel. Water’s unique characteristics make this a case for legal and

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<sup>193</sup> WTO case, *United States - Import Prohibitions of Certain Shrimp and Shrimp Products*, 1998.

academic debate. For the sake of this analysis, water can be broken down into two broad categories, ‘renewable’ and ‘non-renewable’. Jordan’s water crisis is the result of a strain on renewable water resources coupled with inadequate non-renewable resources. Rivers, such as the Seyhan and Ceyhan, are considered renewable water resources despite the fact that their flows are seasonal and can fluctuate dramatically. Literature concerning water basins repeatedly refers to the renewable water capacities of rivers. However, although river water is renewable, rivers are known to dry up, making it appear to be exhaustible. Therefore, the question remains, is river water “exhaustible” despite the fact that it is renewable at the same time?

If it is assumed that the waters of the Seyhan and Ceyhan Rivers are “exhaustible” then the case for export restraints by Turkey under Article XX(g) is strong. However, if Jordan were to initiate a panel based on a violation of the export provisions of Article XI, but Turkey rightfully invoked Article XX(g) in its defense due to a drought, a panel would have to interpret whether or not the Seyhan and Ceyhan Waters are in fact “exhaustible” natural resources. If the panel decided that the Seyhan and Ceyhan Rivers are NOT exhaustible natural resources despite reduced capacity caused by a drought, a ruling could be made in favor of Jordan. In this case, Turkey would be obligated to fulfill the transfer of water to Jordan. This scenario could have interesting implications, particularly if the total flow of the Seyhan or Ceyhan Rivers dropped below that which is necessary to fulfill Turkey’s obligation to Jordan. As it is unlikely that the mouth of the pipeline could be transferred to another source of water such as the Manavgat River in order to compensate for a deficiency in the flow of the Seyhan and Ceyhan Rivers, it is likely that Turkey would simply have to stand in violation of Article XI until the water situation improved.

### **The Special Case of Syria Vis-à-vis the WTO:**

As mentioned previously, Syria is not a member of the WTO, and therefore is not subject to the GATT or any subsequent agreements within the WTO body of law. As a result, Syria’s legal obligations vis-à-vis Turkey and Jordan are regulated by international public law and any bilateral treaties Syria maintains between the two countries. Bodies of international law that all three parties are subject to are the Vienna Convention on the Law of Treaties, and the UN Charter. While neither the Vienna Convention nor the U.N. Charter specifically pertains to water, the Vienna Convention provides a framework for handling legal disputes between the three parties based on treaties or contractual agreements. As members of the U.N., the International Court of Justice can serve as a forum for dispute resolution as well.

Turkey and Syria are both signatories to a number of bilateral treaties concerning the use of transboundary waters between their two countries. These treaties date back to 1921 when Syria was under French rule as part of the post World War I French Mandate. At the time Turkey, Syria, and France signed an agreement permitting the Syrian city of Aleppo to build a water supply system on the Euphrates. Successive treaties and bilateral agreements have been worked out between the two parties since, but none of them takes a pipeline into account.

### **Analysis of the Dispute Between Syria and Turkey over the Waters of the Euphrates:**

The dispute over the waters of the Euphrates has been at a near standstill for decades. International water law has been ineffective in bringing Turkey and Syria to an agreement on the distribution of water from this river. The only major agreement still in effect concerning the waters of the Euphrates is the 1946 Treaty of Friendship and Neighborly Relations between Turkey and Iraq. As Arun P. Elhance notes;<sup>194</sup>

The treaty states that Turkey will, in the event of constructing any water conservation projects on the Euphrates, consult Iraq and make adjustments to such projects so that the needs of both nations are satisfied as far as possible.<sup>195</sup> The treaty is theoretically still in operation; however, by leaving Syria out and by not specifying how the terms of consultation will be defined or adjudicated, the treaty falls far short of being a legal regime to govern water sharing in the basin or for resolving disputes among the riparian states. Consequently, according to one scholar, “the present legal regime can best be categorized as a chaotic regime of claim and counterclaim governed more by political than legal concerns.”<sup>196</sup>

As mentioned previously, Syria and Iraq signed an agreement on January 31, 2001 pertaining to the sharing of the waters of the Euphrates. As this treaty does not include Turkey, the provisions of this treaty are useless as Turkey is the upper riparian in the relationship among the three and is able to dictate the amount of water released downstream. The signing of an agreement between Turkey and Syria in August 2001 is a major step forward. Although the details of this agreement have not been made public it reportedly involves cooperation between the two sides on issues related to the GAP project. And despite the fact that no specific commitments were made by Turkey as to the amount of water it would release to downstream riparians this agreement is a clear indication that Turkey and Syria are able to reach at least some consensus on the issue of the Euphrates and secure it in a written document.<sup>197</sup>

Despite this apparent progress, the main fear regarding the dispute over the Euphrates is that Syria or Iraq will be placed in a position where they feel that military force is the only way to persuade Turkey to release a requisite amount of water downstream. Optimists studying transboundary rivers point out that this is unlikely as parties tend to converge on the issue of water before military exchanges take place. History has shown that wars fought solely over water are very rare. In fact,

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<sup>194</sup> Arun P. Elhance, *Hydropolitics in the 3<sup>rd</sup> World*, (USA, United States Institute of Peace Press, Washington, DC, 1999). Pg. 141.

<sup>195</sup> United Nations, United Nations Treaty Series, vol. 37, 1949 (USA, New York, United Nations, 1949), Pg. 291.

<sup>196</sup> Robert A. Hagar, “The Euphrates Basin: In Search of a Legal Regime”, *Georgetown International Environmental Law Review* 3, No. 1 (summer 1990), Pg. 215.

<sup>197</sup> “Turkey, Syria Agree on Cooperation on GAP Project”, *Turkish Daily News*, 26 August 2001.

The only recorded incident of an outright war over water was 4,500 years ago between two Mesopotamian city-states, Lagash and Umma, in the region we now call southern Iraq. Conversely, between the years 805 and 1984, countries signed more than 3,600 water related treaties, many showing great creativity in dealing with this critical resource. An analysis of 1,831 water related events over the last 50 years reveals that two thirds of these encounters were of a cooperative nature. Nations agreed, for example, to implement joint scientific or technological work and signed 157 water treaties.<sup>198</sup>

This is not to say that military action over water resources is not a contemporary phenomenon. Water resources, particularly in the Middle East, are often part of countries' strategic planning and a threat to any one of these resources can lead to conflict. For example, armed conflict has been a part of the Israel-Syria water relationship. In 1966, just prior to the occupation of the Golan Heights, Syria attempted to divert 77% of the flow of the Hasbani and Baniyas Rivers (both of which make-up a significant portion of the headwaters of the Jordan River) to the detriment of Israel. Israel effectively stopped the construction of the diversion project by launching air strikes against heavy equipment that Syria had moved into the area.<sup>199</sup> The occupation of the Golan Heights the following year was important strategically due to both its proximity to Damascus and the presence of the waters of the Sea of Galilee.

In the event that a multilateral water agreement governing the allocation and use of the waters of the Euphrates is arrived at by Turkey, Syria, and Iraq, it will likely be built upon the legal precedent of prior regional water agreements and at least some of the principles embodied in international agreements such as the 1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses.

## **STRATEGY**

This section contains two potential strategies that could be implemented to gain the necessary support in Jordan, Turkey and Syria for building the Seyhan/Ceyhan pipeline.

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<sup>198</sup> Aaron T. Wolf and Sandra L. Postel, "Dehydrating Conflict," *Foreign Policy* Sep/Oct (2001): 1.

<sup>199</sup> Hussein A. Amery and Aaron T. Wolf, *Water in the Middle East – A Geography of Peace*, (USA, University of Texas Press, 2000). Pg. 156.

This section contains arguments for both strategies that should be articulated to each major stakeholder.

### **Strategy #1: Internal Mobilization**

The goals of this strategy are the following:

#### **Domestic Goals:**

- Persuade Jordanian policymakers to pursue the acquisition of freshwater from Turkey via the Seyhan/Ceyhan pipeline.

If this goal is achieved, the following international goals will be pursued;

#### **International Goals:**

- Persuade Syrian policymakers that cooperating on the construction of the Seyhan/Ceyhan pipeline is in the national interest of Syria.
- Persuade Syria to engage in negotiations with Turkey and Jordan regarding the establishment of the Seyhan/Ceyhan pipeline.
- Persuade Turkish policymakers that cooperating on the construction of the Seyhan/Ceyhan pipeline is in the national interest of Turkey.

### **Strategy Overview in Jordan:**

King Abdullah, the Prime Minister and the king's cabinet are the main decision makers in Jordan. A decision as significant as the establishment of the Seyhan/Ceyhan pipeline and Jordan's reliance on Turkey for freshwater would need the support of these three actors in order to succeed. All of these actors are aware of Jordan's water crisis and as the situation worsens these actors will become more intent on finding a long-term solution to Jordan's water needs. If there is consensus between the King, the Prime Minister, and the Cabinet there is a strong possibility that the Seyhan/Ceyhan pipeline would be pursued.

This strategy will be carried out initially through representatives of the Water Solutions Group in Amman, Jordan. Efforts will then be taken over by the Government of Jordan at the state to state level. Representatives of the Water Solutions Group will engage in efforts to create an internal mobilization movement within the Jordanian government that will lead the government to a positive decision to engage in negotiations with Syria and Turkey regarding the construction of the Seyhan/Ceyhan pipeline. Meetings will be held with the following key individuals in the Jordanian Government to convince them of the need for the Seyhan/Ceyhan pipeline and its feasibility given several alternatives.

The main arguments that will be put forth are the following;

- Jordan needs a new source of freshwater to supplement current supply and erase the current water deficit.

- The Seyhan/Ceyhan pipeline will provide water for Jordan for up to 100 years.
- The Seyhan/Ceyhan pipeline is the best way to supplement Jordan's freshwater supply due its cost effectiveness and potential for initiating regional cooperation with Syria and Turkey.

Those opposed to the pipeline will likely raise the following;

- Jordan should not rely on a foreign country for its water
- Jordan can implement an alternative such as the Red-Dead pipeline to meet its long-term water needs
- The pipeline is too expensive

These arguments will be countered by the following;

Jordan's water crisis is at a point where they must rely on other countries for assistance, whether it is financial or substantive such as with the implementation of the Seyhan/Ceyhan pipeline. In order to provide Jordan with the greatest quantity of water at the lowest price, the pipeline is the best alternative. Commercial data such as cost comparisons will be provided. It is also the hope of the Jordanian Government to increase ties with regional neighbors in order to foster economic growth and build stronger political and social relationships. The Jordanian Government has taken steps to improve relations with Syria over the past several years and has sought out a way to include Turkey in a solution to its water problems in the past. Cooperation in the region is necessary and the pipeline is a perfect opportunity to foster this.

### **Relevant Stakeholders for the Domestic Strategy in Jordan:**

**King Abdullah**  
**Prime Minister**  
**Minister of Foreign Affairs**  
**Minister of Water and Irrigation**  
**Minister of Industry and Trade**  
**Minister of Tourism**  
**Minister of Planning**  
**Minister of Agriculture**

**King Abdullah:** King Abdullah is very aware of Jordan's precarious water situation. In the past he has personally discussed the issue with Turkish leadership. Efforts through phone calls, letters and personal visits to the king's office will be made to capitalize on his interest in Turkish water and to persuade him to pursue the construction of the Seyhan/Ceyhan pipeline.

**Prime Minister:** As in the case of King Abdullah, the Prime Minister is very aware of Jordan's precarious water situation. Efforts through phone calls, letters and personal

visits to the Prime minister's office will be made to persuade him to pursue the construction of the Seyhan/Ceyhan pipeline.

**Minister of Foreign Affairs:** It is in Jordan's best interest to pursue economic, social and political projects that require the cooperation and engagement of Syria and other regional neighbors. This will increase the dependence of these countries on Jordan and strengthen ties between similar sectors in neighboring countries. As relations with Syria have been improving dramatically in the past several years, now is an opportune time to advance the idea of the Seyhan/Ceyhan pipeline.

**Minister of Water and Irrigation:** The Minister is aware more than all other stakeholders of Jordan's precarious water situation. Economic and commercial data as presented in this report will be delivered and explained to the Minister and his staff. As this report has done, the case will be made that the Seyhan/Ceyhan pipeline is the best alternative to relieve Jordan's water crisis.

**Minister of Industry and Trade:** The industrial sector of the economy has grown rapidly in the past decade and this trend is expected to continue. Trade agreements, such as the US Free Trade Agreement, are allowing Jordanian producers to increase production for export. Water use in the industrial sector is expected to increase significantly in the next 20 years. For example, water use in the Industry and Tourism sector combined accounted for 48 MCM of water and only 4% of the national total in 1998. This number is expected to rise to 181 MCM and 11% of the national total by 2020 with a significant proportion of this water being used specifically in industry and manufacturing.

Dirty water and sporadic water service is currently the norm in Jordan. In order for the industrial sector to grow, a reliable source of high quality water must be found and the Seyhan/Ceyhan pipeline meets this need. Efforts through phone calls, letters and personal visits to the Minister's office will be made to persuade him to pursue the construction of the Seyhan/Ceyhan pipeline.

**Minister of Tourism:** The Minister has a huge interest in Jordan's water situation as the tourism sector is dependent on adequate supplies of freshwater to run hotels, resorts and restaurants, particularly in the Amman and Dead Sea areas. Efforts through phone calls, letters and personal visits to the Minister's office will be made as to why he should support the pipeline. Similar efforts will be made by leaders in the tourism sector to convince the Minister of the merits of the pipeline.

**Minister of Planning:** The Minister will be made aware of the long term benefits that the Seyhan/Ceyhan pipeline will have for Jordan. As the coordinator between the Jordanian government and international donor agencies, efforts will be made through phone calls, letters and personal visits to the Minister's office as to why he should support the pipeline. Information on potential sources of funding for the Seyhan/Ceyhan pipeline and terms of a loan will also be provided.

**Minister of Agriculture:** The Minister will be made aware of the benefits of the Seyhan/Ceyhan pipeline in terms of taking pressure off of the agriculture sector which currently fights for water resources due to its extremely high water needs. Efforts through phone calls, letters and personal visits to the Minister's office will be made to show him that the agriculture sector will benefit indirectly from pipeline water. With water available from the pipeline for the residential, industrial and tourism sector, this may give the Ministry of Agriculture more flexibility and time to implement conservation and tariff collection reforms as recommended by the World Bank and other international development groups such as USAID.

### **Timeline for Strategy #1**

#### **July 2003:**

##### **Week One:**

- Present report, "A Strategy for Building a Freshwater Pipeline from Turkey to Jordan" to the following key Jordanian officials;

**King Abdullah**  
**Prime Minister**  
**Minister of Foreign Affairs**  
**Minister of Water and Irrigation**  
**Minister of Industry and Trade**  
**Minister of Tourism**  
**Minister of Planning**  
**Minister of Agriculture**

- Present report to the following construction companies;

**Bechtel** – San Francisco, CA  
**Halliburton/Brown&Root** – Houston, TX  
**Harza Engineering Company** – Chicago, IL  
**CH2M HILL** – Englewood, CO  
**Dong Ah** – South Korea

##### **Weeks Two and Three:**

-Follow-up with each of these individuals and organizations through personal meetings and letters to answer any questions they may have.

##### **Week Four:**

-Continue follow-up.

**August 2003:**

-Depending on previous conversations with the key Jordanian officials, provide additional information on the pipeline project.

-Depending on response from construction companies, provide more information and answer questions. Put construction companies in touch with interested officials in the Government of Jordan.

**Strategy #2: Internal and External Mobilization**

In the event that Strategy #1 cannot be implemented, strategy #2 will be pursued. The goals of this strategy are the following:

**Domestic Goals:**

- Persuade Jordanian policymakers to pursue the acquisition of freshwater from Turkey via the Seyhan/Ceyhan pipeline.

**International Goals:**

- Persuade Syrian policymakers that cooperating on the construction of the Seyhan/Ceyhan pipeline is in the national interest of Syria.
- Persuade Syria to engage in negotiations with Turkey and Jordan regarding the establishment of the Seyhan/Ceyhan pipeline.
- Persuade Turkish policymakers that cooperating on the construction of the Seyhan/Ceyhan pipeline is in the national interest of Turkey.

This strategy will be carried out through the services of a local public relations firm in Amman, Jordan. This strategy will focus on gaining the support of the following key decision makers:

- **King Abdullah II of Jordan**
- **Prime Minister of Jordan**
- **President Assad of Syria**
- **Prime Minister of Syria**
- **President Sezer of Turkey**
- **Prime Minister of Turkey**

Due to the nature of the political systems in Jordan, Syria, and Turkey efforts to lobby these officials will be carried out through personal meetings, phone calls and letters. If, *after the issue is presented to these officials*, the political climate can accommodate a media campaign through print, radio and TV, such efforts will be implemented.

**Strategy Overview in Jordan:**

King Abdullah, the Prime Minister and the king's cabinet are the main decision makers in Jordan. A decision as significant as the establishment of the Seyhan/Ceyhan pipeline and Jordan's reliance on Turkey for freshwater would need the support of these three actors in order to succeed. All of these actors are aware of Jordan's water crisis and as the situation worsens these actors will become more intent on finding a long-term solution to Jordan's water needs. If there is consensus between the King, the Prime Minister, and the Cabinet there is a strong possibility that the Seyhan/Ceyhan pipeline would be pursued.

As major decisions in Jordan are made at the highest levels, efforts will be coordinated to convince the King, Prime Minister, key Cabinet members and leaders in the business and tourism sectors through the actions of public relations lobbyists to convince the Jordanian

leadership that the Seyhan/Ceyhan pipeline is in the best interest of Jordan and their industries. If appropriate, similar efforts will be carried out through a media campaign to convince the public of the merits of the pipeline in order to generate popular support for its implementation. Through meetings, phone calls, and letters the following arguments will be made to respective Jordanian officials, industry stakeholders and the public.

The main arguments that will be put forth are the following;

- Jordan needs a new source of freshwater to supplement current supply and erase the current water deficit.
- The Seyhan/Ceyhan pipeline will provide water for Jordan for up to 100 years.
- The Seyhan/Ceyhan pipeline is the best way to supplement Jordan's freshwater supply due its cost effectiveness and potential for initiating regional cooperation with Syria and Turkey.

Those opposed to the pipeline will likely raise the following;

- Jordan should not rely on a foreign country for its water
- Jordan can implement an alternative such as the Red-Dead pipeline to meet its long-term water needs
- The pipeline is too expensive

These arguments will be countered by the following;

Jordan's water crisis is at a point where they must rely on other countries for assistance, whether it is financial or substantive such as with the implementation of the Seyhan/Ceyhan pipeline. In order to provide Jordan with the greatest quantity of water at the lowest price, the pipeline is the best alternative. Commercial data such as cost comparisons will be provided. It is also the hope of the Jordanian Government to increase ties with regional neighbors in order to foster economic growth and build stronger political and social relationships. The Jordanian Government has taken steps to improve relations with Syria over the past several years and has sought out a way to include Turkey in a solution to its water problems in the past. Cooperation in the region is necessary and the pipeline is a perfect opportunity to foster this.

### **Relevant Stakeholders for the Domestic Strategy in Jordan:**

**King Abdullah**

**Prime Minister**

**Minister of Foreign Affairs**

**Minister of Water and Irrigation**

**The Water Authority of Jordan**

**The Jordan Valley Authority**

**Minister of Industry and Trade**

**Minister of Finance**

**Minister of Tourism**

**Minister of Planning**  
**Minister of Agriculture**  
**Farmers**  
**The Public**  
**Business Leaders**  
**Tourism Sector Leaders**

**King Abdullah:** King Abdullah is very aware of Jordan's precarious water situation. In the past he has personally discussed the issue with Turkish leadership. Efforts through phone calls, letters and personal visits to the king's office will be made to capitalize on his interest in Turkish water and to persuade him to pursue the construction of the Seyhan/Ceyhan pipeline.

**Prime Minister:** As in the case of King Abdullah, the Prime Minister is very aware of Jordan's precarious water situation. Efforts through phone calls, letters and personal visits to the Prime minister's office will be made to persuade him to pursue the construction of the Seyhan/Ceyhan pipeline.

**Minister of Foreign Affairs:** It is in Jordan's best interest to pursue economic, social and political projects that require the cooperation and engagement of Syria and other regional neighbors. This will increase the dependence of these countries on Jordan and strengthen ties between similar sectors in neighboring countries. As relations with Syria have been improving dramatically in the past several years, now is an opportune time to advance the idea of the Seyhan/Ceyhan pipeline.

**Minister of Industry and Trade:** The industrial sector of the economy has grown rapidly in the past decade and this trend is expected to continue. Trade agreements, such as the US Free Trade Agreement, are allowing Jordanian producers to increase production for export. Water use in the industrial sector is expected to increase significantly in the next 20 years. For example, water use in the Industry and Tourism sector combined accounted for 48 MCM of water and only 4% of the national total in 1998. This number is expected to rise to 181 MCM and 11% of the national total by 2020 with a significant proportion of this water being used specifically in industry and manufacturing.

Dirty water and sporadic water service is currently the norm in Jordan. In order for the industrial sector to grow, a reliable source of high quality water must be found and the Seyhan/Ceyhan pipeline meets this need. Efforts through phone calls, letters and personal visits to the Minister's office will be made to persuade him to pursue the construction of the Seyhan/Ceyhan pipeline.

**Minister of Finance:** Jordan's financial situation is shaky with heavy debt and limited foreign direct investment coming into the country. The Minister of Water and Irrigation has been mentioned that a reliable source of high quality water is needed for future economic growth and social development. In order to reverse some of the country's financial burden and bring added revenue to the country's treasury, the Seyhan/Ceyhan

pipeline should be built. The pipeline will generate a profit each successive year of operation which will be to the benefit to the country's treasury. Related economic growth will result in greater tax revenues and more foreign direct investment.

**Minister of Tourism:** The Minister has a huge interest in Jordan's water situation as the tourism sector is dependent on adequate supplies of freshwater to run hotels, resorts and restaurants, particularly in the Amman and Dead Sea areas. Efforts through phone calls, letters and personal visits to the Minister's office will be made as to why he should support the pipeline. Similar efforts will be made by leaders in the tourism sector to convince the Minister of the merits of the pipeline.

**Minister of Water and Irrigation:** The Minister is aware more than all other stakeholders of Jordan's precarious water situation. Economic and commercial data as presented in this report will be delivered and explained to the Minister and his staff. As this report has done, the case will be made that the Seyhan/Ceyhan pipeline is the best alternative to relieve Jordan's water crisis.

**Minister of Planning:** The Minister will be made aware of the long term benefits that the Seyhan/Ceyhan pipeline will have for Jordan. As the coordinator between the Jordanian government and international donor agencies, efforts will be made through phone calls, letters and personal visits to the Minister's office as to why he should support the pipeline. Information on potential sources of funding for the Seyhan/Ceyhan pipeline and terms of a loan will also be provided.

**Minister of Agriculture:** The Minister will be made aware of the benefits of the Seyhan/Ceyhan pipeline in terms of taking pressure off of the agriculture sector which currently fights for water resources due to its extremely high demand. Efforts through phone calls, letters and personal visits to the Minister's office will be made to show him that the agriculture sector will benefit indirectly from pipeline water. With water available from the pipeline for the residential, industrial and tourism sector, this may give the Ministry of Agriculture more flexibility and time to implement conservation and tariff collection reforms as recommended by the World Bank and other international development groups such as USAID.

**The Business Community:** Efforts will be made through meetings and phone calls to inform business leaders of the benefits of the Seyhan/Ceyhan pipeline. As representatives in this sector have much to gain or lose due to Jordan's water crisis, they will likely be receptive to arguments for the pipeline. Of course there will be some members of this community that, like some of the political leaders, will not want to rely on Turkey and Syria for their water, but persistent arguments in favor of regional cooperation and economic benefits will be put forth.

**The Tourism Sector:** As with the business community, efforts will be made through meetings and phone calls to inform leaders within the tourism sector of the benefits of the Seyhan/Ceyhan pipeline. Representatives in this sector will have a significant amount of influence on the government's decision making process as the government is committed

to making Jordan a top international tourist destination. Persistent arguments in favor of regional cooperation and the economic benefits of the pipeline will be put forth.

**The Public:** Residential water users have a lot to gain if the Seyhan/Ceyhan pipeline is implemented. As water service and quality is generally poor in Jordan, consumers will be encouraged to inform their political and business leaders that they demand better water and will be willing to pay for it. However, an issue as sensitive as the water situation in Jordan may not be able to accommodate an aggressive media campaign. Therefore, efforts will be taken to persuade key social leaders in support of the pipeline to, in turn, encourage their constituencies to inform government officials of the need for the pipeline.

As mentioned previously, efforts will be taken to convince business and tourism leaders of the merits of the pipeline. Once these individuals are on board, grassroots efforts will be coordinated with their assistance to inform the public of the benefits of the Seyhan/Ceyhan pipeline. Although political decisions are not typically made in Jordan according to mobilization politics, information and momentum gained from these efforts will then be transferred up to the leadership through phone calls and personal contact with public officials and influential members of the community.

If enough momentum is gained this issue will likely become front-page news as the pipeline would be one of the largest transboundary and water engineering projects in the world. In this case, the role of the public becomes even more important in continuing to keep the pipeline on the agenda of decision makers.

### **Media Strategy in Jordan:**

#### **Print:**

Jordan does not have a completely free media and a media campaign will be limited. However, domestic, regional and international newspapers and magazines are widely circulated. Advertisements and opinion pieces can be placed in these publications in favor of the Seyhan/Ceyhan pipeline. Jordanian publications that should be targeted are Al-Ra'i, Al-Dustour, and the Jordan Times. International papers that should be targeted are The Middle East (Arabic), Al-Hayat (Arabic), The International Herald Tribune, Al-Majella (Arabic), and Newsweek (Arabic) as they are read by policy makers and community leaders and they have the farthest reach geographically and politically.

#### **Television:**

TV will likely not be used as a media tool to promote the pipeline except in cases where talk shows host government officials and business leaders to present information and hold debate on the issue. Call-in shows are popular in the Arab world, particularly on networks such as Al-Jazeera and the Lebanese Broadcasting Corporation. Although these networks are not located in Jordan they are widely watched throughout Jordan and host shows on a variety of issues facing Arab countries. These shows will be a particularly good opportunity for guests to explain Jordan's precarious water situation, the merits of

the pipeline, and ease worries the public may have about relying on another country for its water. Guests in favor of the pipeline can also outline the economic, social and political benefits that the pipeline will bring in light of other alternatives.

Efforts will be made to arrange interviews on these networks that will place high ranking government or business and tourism leaders in the spotlight.

**Radio:**

Radio is a very popular source of information in Jordan and the Arab world as a whole, including call-in shows. Efforts will be taken to air broadcasts in which various government officials and business leaders present information and hold debate on the pipeline issue. As in the case of TV, these shows will be a particularly good opportunity for guests to explain Jordan's precarious water situation, the merits of the pipeline, and ease worries the public may have about relying on another country for its water. Guests in favor of the pipeline can also outline the economic, social and political benefits that the pipeline will bring in light of other alternatives.

**Strategy Overview in Syria:**

Syria's decision making process is very top down with most authority and decision making power held by the president. The current president, Bashar al-Assad succeeded his father, Hafez Al-Assad, in 2000. President Assad is seen as more liberal than his father, but Syria is still a very closed country socially and economically relative to Jordan and Turkey. If the top leadership in Syria can be convinced of the merits of the Seyhan/Ceyhan pipeline, the public and business interests will follow.

As decisions are made at the top in Syria, the country's leadership must be convinced of the viability and benefits of the Seyhan/Ceyhan pipeline. Efforts will be made by lobbyists and those with political connections to the Assad family to convince the Syrian leadership that the Seyhan/Ceyhan pipeline is in the best political, economic and social interests of Syria. Through meetings, phone calls, and letters the following arguments will be made to the following stakeholders;

- The Seyhan/Ceyhan pipeline will create employment opportunities for Syrians at pumping stations and with contractors performing routine maintenance on the system.
- Syria will benefit from foreign direct investment brought by construction contracts and related services.
- Syria will gain a source of revenue in the form of transit fees from Jordan.
- The pipeline will result in stronger Syrian economic relations with both Turkey and Jordan which could translate into stronger political relations between the three countries.
- The pipeline could provide a source of water for the cities of Aleppo and Damascus.

- Jordan's reliance on Syria for the transit of water would give Syria political leverage over Jordan.

The main argument that will likely be raised by those opposed to the pipeline is the following;

- Syria should not cooperate on the pipeline until Turkey comes to a resolution on the issue of the Euphrates.

This argument will be countered by the following;

Syria and Turkey reached some type of an agreement on the issue of the Euphrates in 2001. The details of this agreement were not made public, but raising the issue in the context of a major transboundary project like the pipeline might persuade the Syrian government to release the details of the agreement. If the terms of the agreement could be improved from Syria's perspective, and if Turkey realizes that a pipeline is only possible if Syria is satisfied on the Euphrates issue, this might persuade Turkey to re-open negotiations over the issue of the Euphrates and come to a resolution that Syria determines more beneficial. In this case, Syria would win on the issue of the Euphrates and win on the issue of being able to host the pipeline and reap the benefits mentioned above.

Additionally, the new Syrian government is taking steps to improve the Syria-Turkey relationship. This is evidenced by the signing of two military cooperation agreements signed between the countries in June 2002 as well as increased diplomatic cooperation between Damascus and Ankara.

Relevant stakeholders for the domestic strategy in Syria:

**President**

**Prime Minister**

**Minister of Foreign Affairs**

**Minister of Economy and Foreign Trade**

**Minister of Agriculture**

**Farmers**

**Minister of Irrigation**

**Minister of Electricity**

**Minister of Finance**

**Mayors of Damascus and Aleppo**

### **Political Strategy in Syria:**

**President:** A transboundary project the size of the Seyhan/Ceyhan pipeline will need the personal approval of President Assad. Efforts, mainly through personal meetings and phone calls, will be made to convince him of the benefits that a pipeline from Turkey

could have on Syria's regional political, economic and social position. A major project such as the Seyhan/Ceyhan pipeline would greatly enhance contact between Syria and Turkey and provide an opportunity to build on recent progress at the political, economic and military levels between the two countries.

**Prime Minister:** The Prime Minister will likely follow the lead of President Assad, or vice versa depending on the nature of their relationship and how power is shared. As in the case of the President, efforts through meetings, phone calls and letters will be made to inform him of the political, economic and social benefits the Seyhan/Ceyhan pipeline project could bring to Syria.

**Minister of Foreign Affairs:** The Minister of Foreign Affairs will likely follow the lead of the President and Prime Minister. The Minister of Foreign Affairs may have a long run interest in the Seyhan/Ceyhan pipeline as Syria offered a bid to join the WTO in 2001. As a candidate for succession, Syria needs to prove to WTO member nations that it is serious about improving trading relations with other countries. If WTO membership is granted, broader political relations between Syria and the international community will subsequently become more important. Efforts will be made through meetings, letters and phone calls to convince the Minister of the long-run benefits that the pipeline could have on Syria's regional political position. This will give him reason to lobby the President to support the project.

**Minister of Economy and Foreign Trade:** The Minister of Economy and Trade will likely follow the lead of the President and Prime Minister. Efforts through meetings, letters and phone calls, will be made to convince the Minister of the economic benefits that will result for Syria if the pipeline is built. These include job opportunities on the pipeline both during and after construction, foreign direct investment by the pipeline construction company, and an influx of engineering and technical expertise to Syria. As in the case of the Minister of Foreign Affairs, The Minister of Economy and Foreign Trade may have a long run interest in the Seyhan/Ceyhan pipeline as Syria offered a bid to join the WTO in 2001. As a candidate for accession, Syria needs to prove to WTO member nations that it is serious about improving trading relations with other countries. If WTO membership is granted, broader economic relations between Syria and the international community will subsequently become more important.

**Minister of Agriculture:** The Minister of Agriculture will likely follow the lead of the President and Prime Minister. Efforts through meetings, phone calls and letters will be made to convince the Minister that supporting the Seyhan/Ceyhan pipeline could result in a broader agreement that would supply Syria with a greater quantity of Euphrates River water. If this occurs, the Minister of Agriculture would have more water available to carry out agriculture expansion in northeast Syria and increase the country's overall agriculture production.

**Minister of Irrigation:** The Minister of Irrigation will likely follow the lead of the President and Prime Minister. As in the case of the Minister of Agriculture, efforts through meetings, phone calls and letters will be made to convince the Minister that

supporting the Seyhan/Ceyhan pipeline could result in a broader agreement that would supply Syria with a greater quantity of Euphrates River water. If this occurs, the Minister of Irrigation would have more water available to carry out agriculture expansion in northeast Syria.

**Minister of Electricity:** The Minister of Electricity will likely follow the lead of the President and Prime Minister. Efforts through meetings, phone calls and letters will be made to convince this Minister that supporting the Seyhan/Ceyhan pipeline is in his interest as his Ministry will be an integral part in coordinating power supply to pumping stations along the pipeline if it is built. This will raise the importance of his Ministry in the long-term and its position in Syria/Turkish/Jordanian relations.

**Minister of Finance:** The Minister of Finance will likely follow the lead of the President and Prime Minister. Efforts through meetings, phone calls and letters will be made to convince the Minister that Syria will benefit monetarily in the form of transit fees from Jordan if the Seyhan/Ceyhan pipeline is built. Additionally, if the pipeline supplies water to the cities of Aleppo and Damascus this will facilitate economic growth and, in turn, greater revenues gained from water tariffs and taxes.

**Mayors of Aleppo and Damascus:** As with the other Ministers, the Mayors of Aleppo and Damascus will likely follow the lead of the President and Prime Minister, however, the mayors of these cities will probably be more aware of their cities water problems than the cabinet level officials. Efforts through meetings, phone calls and letters will be made to inform the mayors of the benefits the Seyhan/Ceyhan pipeline will have for their cities in terms of jobs and additional water for the residential and industrial sectors. Efforts will be made to convince them to lobby cabinet officials to support the implementation of the pipeline.

### **Media Strategy in Syria:**

Syria's media is closely monitored by the government and all sources of media are censored when the government determines it is necessary. Several exceptions to this are satellite TV broadcasts and radio programs such as the BBC and the Voice of America. Although there is a wide variety of regional and western newspapers and magazines available in Syria, articles dealing with Syrian politics are often removed by the government prior to distribution. A media strategy in Syria will likely be ineffective in convincing public officials of the merits of the Seyhan/Ceyhan pipeline as information on the topic will be suppressed if the government's official position is not in favor of the project. However, if the government does approve of the project, the media can be used as a tool to educate and shape public opinion on the issue and prepare the public for the pipeline's implementation.

**Print:** A print media strategy will be difficult or impossible without the consent of the Syrian government. However, if the government supports the construction of the Seyhan/Ceyhan pipeline they will possibly begin their own strategy to inform the public of the project and its potential benefits for Syria. Until this occurs, efforts similar to

those taken in Jordan should be pursued, such as placing advertisements and opinion pieces in publications such as The Middle East (Arabic), Al-Hayat (Arabic), The International Herald Tribune, and Newsweek (Arabic) as these publications are all available in Syria. If the Syrian government disapproves of what is written they will simply censor the papers prior to distribution. If they approve there should be no difficulty with their distribution.

**TV:** Syrian state run TV is under scrutiny similar to that of the print media. If the government supports the Seyhan/Ceyhan pipeline, TV will be a good vehicle to get the message out concerning the benefits of the pipeline. Policy officials involved in the pipeline project as well as regional water experts could be influential in helping to shape public opinion on the issue. Programs such as call-in shows could be effective in addressing concerns of the public regarding the pipeline as well as re-enforcing the economic, political and social benefits of the project.

As international networks such as Al-Jazeera and the Lebanese Broadcasting Corporation are not controlled by the Syrian Government, efforts will be made to arrange interviews on these networks that will initially place NON-Syrian proponents of the pipeline in the spotlight. If the Syrian government supports the Seyhan/Ceyhan pipeline efforts will be made to place high ranking Syrian Government or business and tourism leaders in the spotlight.

**Radio:** As with print and TV, Syrian radio is under tight scrutiny. As in the case of TV, if the government supports the Seyhan/Ceyhan pipeline, radio will be a good vehicle to get the message out concerning the benefits of the pipeline. Policy officials involved in the pipeline project as well as regional water experts could be influential in helping to shape public opinion on the issue. Programs such as call-in shows could be effective in addressing concerns of the public regarding the pipeline as well as re-enforcing the economic, political and social benefits of the project.

### **Strategy Overview in Turkey:**

Of the countries involved in the Seyhan/Ceyhan pipeline, Turkey will likely need the least amount of persuasion to support the project. Turkish policy currently allows the export of Turkish water and Turkey's initial "peace pipeline" proposal in 1987 is a clear indication that a pipeline such as the Seyhan/Ceyhan is something the Turkish government would show a keen interest in. However, a project of this magnitude would need the approval of the Turkish President, Prime Minister and several key cabinet officials. The decision to sell water to Jordan via Syria will likely not be an issue of large public concern unless Turkey's sale of water is to the detriment of Turkey's domestic water needs. As this does not appear to be the case, a media strategy is not necessary, however close cooperation and lobbying of key government officials is critical.

Turkey's decision to build the Seyhan/Ceyhan pipeline will likely come as a result of a convergence of interests between the President, Prime Minister and a number of key cabinet officials. Efforts will be made by lobbyists and those with political connections

to the current administration to convince the Turkish leadership that the Seyhan/Ceyhan pipeline is in the best interest of Turkey. Through meetings, phone calls and letters the following arguments will be made to respective Turkish stakeholders.

The main arguments that will be put forth are the following;

- Turkey can benefit financially by selling water to Jordan through the Seyhan/Ceyhan pipeline.
- By participating in the Seyhan/Ceyhan pipeline Turkey will increase opportunities for further economic, political and military cooperation with Syria and further economic and political cooperation with Jordan.
- Syria's reliance on Turkey for pipeline water would give Turkey political leverage over Syria.

Those opposed to the pipeline will likely raise the following;

- The pipeline may dislocate those that live near its mouth or near the Seyhan and Ceyhan Rivers.
- There is no guarantee that relations will improve with Syria just because they cooperate on the pipeline.

These arguments will be countered by the following;

The construction of the pipeline will likely not significantly disrupt the Seyhan and Ceyhan River region. As the flow of these rivers is 15.19 billion cubic meters annually and the pipeline would only be using a fraction of this, any catchment basin or dam structure would likely be only slightly disruptive. Feasibility studies on the project would include an environmental impact assessment in order to determine exactly what, if any, negative effect the pipeline may have on the surrounding area.

While there is no guarantee that relations will improve with Syria just because of the pipeline, the project gives Syria a great incentive to cooperate with Turkey as Syria will be gaining a transit fee for every cubic meter of water that passes through its territory. Syria may also be interested in using a portion of the pipeline water for use in Aleppo and Damascus as these two cities are suffering from water shortages of their own. If the pipeline is built Syria will have an incentive to cooperate with Turkey and maintain good relations as they will realize that any downturn in relations could result in Turkey turning off the flow of pipeline water or restricting the flow of the Euphrates as was done in the past.

#### **Relevant Stakeholders for the Domestic Strategy in Turkey:**

**President**

**Prime Minister**

**Minister of Foreign Affairs**

**Minister of Industry and Trade**

**Minister of Agriculture**

**Farmers**

**Minister of Water and Irrigation**

**Minister of Finance**

**Locals Living at the Mouth of the Pipeline**

**Political Strategy in Turkey:**

**President:** As the head of state, efforts, such as meetings, phone calls and letters will be taken to provide data and political analysis to the office of the President to inform him that the sale of water to Jordan via the Seyhan/Ceyhan pipeline is in the national economic and strategic interest of Turkey. The President's support for the pipeline will likely persuade many cabinet officials to support the project.

**Prime Minister:** As the head of the government, the Prime Minister will be critical in influencing the positions of key cabinet officials. Efforts similar to those taken with the president will be carried out in the form of meetings, phone calls and letters to provide data and political analysis to the Prime Minister informing him of the economic and political benefits that the sale of water to Jordan via the Seyhan/Ceyhan pipeline will bring to Turkey.

**Minister of Foreign Affairs:** Efforts through meetings, letters and phone calls will be made to provide the Minister with economic data and political analyses showing the pro's and con's of the Seyhan/Ceyhan pipeline and why Turkey should pursue this project. Emphasis will be placed on how the pipeline will lead to better foreign and economic relations between Turkey, Syria and Jordan with the possibility of further agreements on the issues of the Euphrates River and diminishing Syria's support, albeit limited, for the Kurdish opposition in southeast Turkey.

**Minister of Industry and Trade:** The Minister of Industry and Trade has an interest in improving Turkey's trading relationship with Syria and the pursuit of greater economic growth nationally. Efforts through letters, phone calls and meetings will be made to provide the Minister with economic data and political analyses showing the pro's and con's of the Seyhan/Ceyhan pipeline and why Turkey should pursue this project. Emphasis will be placed on how the pipeline will lead to better economic and trade relations between the three countries.

**Minister of Agriculture:** The Minister of Agriculture is closely involved with the GAP project that will result in the development of agricultural land in southeast Turkey. Any project that might be seen as detracting from the ability to develop this region could be viewed negatively. Efforts through meetings, phone calls and letters will be made to provide the Minister with information showing the pro's and con's of the Seyhan/Ceyhan pipeline with an emphasis on how the waters of the Seyhan and Ceyhan Rivers are not integral to the GAP plan and therefore should be made available for export.

**Minister of Water and Irrigation:** As with the Minister of Agriculture, The Minister of Water and Irrigation is closely involved with the GAP project that will result in the development of agricultural land in southeast Turkey. Any project that might be seen as detracting from the ability to develop this region could be viewed negatively. Efforts through meetings, phone calls and letters will be made to provide the Minister with information showing the pro's and con's of the Seyhan/Ceyhan pipeline with an emphasis on how the waters of the Seyhan and Ceyhan Rivers are not integral to the GAP plan and therefore should be made available for export.

**Minister of Finance:** The Minister of Finance possibly has the most to gain if the Seyhan/Ceyhan pipeline is built. Efforts through meetings, phone calls and letters will be made to provide the Minister with information showing the financial pro's and con's of the Seyhan/Ceyhan pipeline with an emphasis on how the export of the waters of the Seyhan and Ceyhan Rivers will lead to millions of dollars in revenue for the Turkish treasury at little cost to the Turkish government.

### **International**

**The World Bank:** Copies of any feasibility studies conducted regarding the implementation of the Seyhan/Ceyhan pipeline will be submitted to the World Bank with a funding request.

**International Lenders:** Copies of any feasibility studies conducted regarding the implementation of the Seyhan/Ceyhan pipeline will be submitted to international lenders with a funding request. These lenders include the Arab Fund for Social and Economic Development (Kuwait), the Islamic Development Bank (Saudi Arabia), the National Bank of Abu Dhabi, and Barclay's Bank (UK).

### **Construction Companies:**

There are numerous international construction companies that would likely be interested in conducting a feasibility study on the Seyhan/Ceyhan pipeline with the hope of obtaining the award to build it. The following companies are potential candidates;

**Bechtel** – San Francisco, CA

**Halliburton/Brown&Root** – Houston, TX

**Harza Engineering Company** – Chicago, IL

**CH2M HILL** – Englewood, CO

**Dong Ah** – South Korea

These construction companies will all be contacted and given this report. They can supplement this information with their professional expertise and engage in their own lobbying efforts with the relevant organizations and governments concerning the pipeline. Completed feasibility studies done by these companies will give the governments involved a more precise idea of construction and O&M costs.

**Timeline for Strategy #2**

**July 2003:**

**Week One:**

- Present report, “A Strategy for Building a Freshwater Pipeline from Turkey to Jordan” to the following stakeholders;

**Jordan**

**King Abdullah**

**Prime Minister**

**Minister of Foreign Affairs**

**Minister of Water and Irrigation**

**The Water Authority of Jordan**

**The Jordan Valley Authority**

**Minister of Industry and Trade**

**Minister of Finance**

**Minister of Tourism**

**Minister of Planning**

**Minister of Agriculture**

**Farmers**

**The Public**

**Business Leaders**

**Tourism Sector Leaders**

**Syria**

**President**

**Prime Minister**

**Minister of Foreign Affairs**

**Minister of Economy and Foreign Trade**

**Minister of Agriculture**

**Minister of Irrigation**

**Minister of Electricity**

**Minister of Finance**

**Mayors of Damascus and Aleppo**

**Turkey**

**President**

**Prime Minister**

**Minister of Foreign Affairs**

**Minister of Industry and Trade**

**Minister of Agriculture**

**Minister of Water and Irrigation**

**Minister of Finance**

**International**

**The World Bank**  
**Arab Fund for Social and Economic Development (Kuwait)**  
**The Islamic Development Bank (Saudi Arabia)**  
**The National Bank of Abu Dhabi**  
**Barclay's Bank (UK)**

**Bechtel** – San Francisco, CA  
**Halliburton/Brown&Root** – Houston, TX  
**Harza Engineering Company** – Chicago, IL  
**CH2M HILL** – Englewood, CO  
**Dong Ah** – South Korea

**Weeks Two and Three:**

-Follow-up with each of these individuals and organizations through personal meetings and letters to answer any questions they may have.

- Put construction companies in touch with interested officials in the Government of Jordan.

**Week Four:**

-Continue follow-up.

-Depending on response from construction companies, provide more information and answer questions.

**August 2003:**

**Week One:**

-If the response from the Government of Jordan is positive, the media campaign in Jordan will be initiated. This will involve placing advertisements in newspapers and magazines such as;

**Local:**

Al-Ra'i  
Al-Dustour  
Jordan Times

**International:**

The Middle East  
Al-Hayat  
The International Herald Tribune  
Al-Majella  
Newsweek

-Arrange radio and television interviews.

-Follow-up with government officials.

**Week Two:**

-Continue media efforts through print, T.V. and radio.

-Follow-up with government officials.

**Week Three:**

-Continue media efforts through print, T.V. and radio.

-Follow-up with government officials.

**Week Four:**

-Continue media efforts through print, T.V. and radio.

-Follow-up with government officials.

Sample Letter to King Abdullah II of Jordan concerning the water crisis in Jordan and the Seyhan/Ceyhan pipeline;

**The Water Solutions Group**  
1255 Westmoreland Way

Washington, DC 20003  
(202)422-1855

5 June 2003

His Excellency King Abdullah II of the Hashemite Kingdom of Jordan  
Royal Administrative Bldg.  
Abdulhameed Street  
Amman, Jordan

His Excellency King Abdullah II,

This letter and the attached report entitled, "*A Strategy to Build a Freshwater Pipeline from Turkey to Jordan*" are compliments of The Water Solutions Group, a non-profit organization that is involved in researching ways to alleviate water shortages and address water related issues around the world. As you are aware, Jordan is facing a chronic shortage of freshwater. Per capita water use in Jordan is among the lowest in the world and it is believed that economic and social growth will be severely impacted by the lack of freshwater with each passing year. Current freshwater demand in Jordan is outpacing renewable supply by about 300 MCM per year. This large water deficit is being made up by drawing down non-renewable aquifers and implementing water saving measures such as rationing and renovating old water systems in municipal areas that lose significant amounts of water due to leaky pipes.

Jordan should implement a long-term strategy to supplement its freshwater supply. Options for achieving this include the desalination of seawater, shipping water to Jordan or building a transnational water pipeline from the Seyhan and Ceyhan Rivers in southern Turkey to Jordan in order to supply Jordan with much needed water. The cheapest and most politically beneficial of these alternatives is the pipeline from Turkey. The pipeline will provide Jordan with a significant amount of Turkey's excess freshwater for nearly 100 years.

The attached report gives an in-depth explanation of Jordan's water crisis and the commercial, economic, legal and political issues that would accompany the construction of the Seyhan/Ceyhan pipeline. If you have any questions or would like to discuss this issue further with an expert on our staff, please call our offices.

Sincerely,

Tyler Hoffman

Sample letter to Minister of Water and Irrigation, Dr. Hazim El-Naser, concerning the water crisis in Jordan and the Seyhan/Ceyhan pipeline;

**The Water Solutions Group**

1255 Westmoreland Way  
Washington, DC 20003

(202)422-1855

5 June 2003

Dr. Hazim El-Naser  
Jordanian Ministry of Water and Irrigation  
Amman, Jordan

Dear Dr. El-Naser,

This letter and the attached report entitled, “*A Strategy to Build a Freshwater Pipeline from Turkey to Jordan*” are compliments of The Water Solutions Group, a non-profit organization that is involved in researching ways to alleviate water shortages and address water related issues around the world. As you are aware, Jordan is facing a chronic shortage of freshwater. Per capita water use in Jordan is among the lowest in the world and it is believed that economic and social growth will be severely impacted by the lack of freshwater with each passing year. Current freshwater demand in Jordan is outpacing renewable supply by about 300 MCM per year. This large water deficit is being made up by drawing down non-renewable aquifers and implementing water saving measures such as rationing and renovating old water systems in municipal areas that lose significant amounts of water due to leaky pipes.

Jordan should implement a long-term strategy to supplement its freshwater supply. Options for achieving this include the desalination of seawater, shipping water to Jordan or building a transnational water pipeline from the Seyhan and Ceyhan Rivers in southern Turkey to Jordan in order to supply Jordan with much needed water. The cheapest and most politically beneficial of these alternatives is the pipeline from Turkey. The pipeline will provide Jordan with a significant amount of Turkey’s excess freshwater for nearly 100 years.

The attached report gives an in-depth explanation of Jordan’s water crisis and the commercial, economic, legal and political issues that would accompany the construction of the Seyhan/Ceyhan pipeline. If you have any questions or would like to discuss this issue further with an expert on our staff, please call our offices.

Sincerely,

Tyler Hoffman  
Sample Op-Ed to be submitted to one of several newspapers for publication concerning the water crisis in Jordan and the Seyhan/Ceyhan pipeline;

### **Water for the Future**

By: Tyler Hoffman of the Water Solutions Group

Jordan is facing a chronic shortage of freshwater. Steps are currently being taken to address Jordan's water needs but it is clear that in order to meet future demand, a new source of freshwater must be developed. The Water Solutions Group, a non-profit organization that is involved in researching ways to alleviate water shortages around the world, recently presented the Government of Jordan with a comprehensive report endorsing the construction of a large freshwater pipeline originating at the Seyhan and Ceyhan Rivers in southern Turkey and terminating in Amman. This pipeline would erase Jordan's current water deficit and provide adequate supplies of water for years to come at low cost. This pipeline should be seriously considered given the high cost of alternatives such as the Red-Dead pipeline, shipping water to Aqaba and pumping it to Amman, and desalination.

Per capita water use in Jordan is among the lowest in the world and it is believed that economic and social growth will be severely impacted by the lack of freshwater with each passing year. Current freshwater demand in Jordan is outpacing renewable supply by about 300 MCM per year. This large water deficit is being made up by drawing down non-renewable aquifers, and implementing numerous water saving measures. Although these are positive steps, Jordan's freshwater deficits are expected to increase in the future.

Desalination is the method of choice for supplementing water supplies in most Middle Eastern countries. Saudi Arabia has had great success producing desalinated water, but this is only because it has access to oil, a vital component in the energy intensive desalination process. Desalination is an expensive proposition for Jordan as large quantities of oil would need to be imported and water would have to be pumped roughly 325 kilometers north to Amman for consumption. Although feasible, enormous capital costs and long term operation and maintenance costs make this option cost prohibitive.

Shipping water from Turkey to Aqaba and then pumping it to Amman eliminates the need for large quantities of oil, but shipping costs make this option undesirable. Under this scheme it is estimated that the cost to deliver each cubic meter of water would quadruple. Jordan simply cannot afford this.

The Red-Dead pipeline is another option under serious consideration for supplementing Jordan's freshwater supply. This project entails a pipeline system originating in Aqaba to provide seawater to refill the shrinking Dead Sea, provide desalinated water to Amman, the West Bank and Jerusalem, and generate electricity. The cost of this project is enormous and heavy long run costs would be incurred to replace desalination plants as they burn out. The cost of this project and uncertainty about negative environmental externalities make this option less attractive than a simple pipeline from Turkey.

A freshwater pipeline from Turkey to Jordan would meet Jordan's freshwater needs for years to come at a much lower cost than desalination, shipping water, or the Red-Dead pipeline.

Turkey has invested millions of dollars into a state of the art water export facility on the Manavgat River and is actively looking for customers to purchase its excess water. A

pipeline from Turkey to Jordan would require significant investment, but the long run benefits far outweigh initial costs. A similar pipeline was proposed in 1987, however, the project never made it out of the planning stages due to hesitation on the part of Middle Eastern nations to rely on Turkey for water. While this concern was, and continues to be, valid the construction of the water pipeline would provide a significant opportunity for regional economic and political cooperation. Cooperation, as we have seen in recent years in once isolated places such as Eastern and Southern Europe has led to significant social, economic and political growth.

Bilateral and multilateral interaction at the political and economic levels is the lowest in the world among the nations of the Middle East. This must change if Jordan and its neighbors are to experience economic growth and political cooperation in coming years as regional economic growth will likely be based on increased interaction between neighbors. The water pipeline project is an excellent, cost effective way to initiate interaction and cooperation between Jordan and its neighbors.

The benefits of the pipeline project are numerous, the most obvious being additional water for Jordan's municipal, tourism and industrial sectors. The tourism and industrial sectors are expected to be the lifeblood of Jordan's economy in the coming decades, however, they will falter without adequate supplies of freshwater. The benefits of greater political and economic cooperation that the pipeline could bring cannot be quantified on paper and it is clear that the region needs greater progress in this area. Jordan is dying of thirst and a water pipeline from Turkey to Amman is the best way to meet the country's future water needs.

Sample white paper endorsing the Seyhan/Ceyhan pipeline to be distributed to Jordanian policy makers, academics and journalists.

### **Jordan's Water Crisis Finally has an Innovative Solution**

By: Tyler Hoffman of the Water Solutions Group

Jordan is facing a chronic shortage of freshwater. Steps are currently being taken to address Jordan's water needs but it is clear that in order to meet future demand, a new source of freshwater must be developed. The Water Solutions Group, a non-profit organization involved in researching ways to alleviate water shortages around the world, recently presented the Government of Jordan with a comprehensive report endorsing the construction of a large freshwater pipeline originating at the Seyhan and Ceyhan Rivers in southern Turkey and terminating in Amman. This pipeline would provide enough water to erase Jordan's current water deficit and provide adequate supplies of water for years to come at low cost. This pipeline should be seriously considered given the high cost of alternatives such as the Red-Dead pipeline, shipping water to Aqaba and pumping it to Amman, and desalination.

This white paper addresses Jordan's current water crisis and examines alternatives for alleviating it. The Water Solutions Group believes that in order to alleviate Jordan's current and future water deficits the Government of Jordan should take steps to implement the Seyhan/Ceyhan pipeline.

### **Jordan's Water Situation**

Per capita water use in Jordan is among the lowest in the world and it is believed that Jordan's economic and social growth will be severely impacted by the lack of freshwater with each passing year. Current freshwater demand in Jordan is outpacing renewable supply by about 300 million cubic meters (MCM) per year. This large water deficit is being made up by drawing down non-renewable aquifers and implementing numerous water saving measures throughout the country. Although these are positive steps, they will not be adequate in the long-term and Jordan's freshwater deficits are expected to substantially increase in the future.

Jordan's freshwater supply is precarious at best. Historically, the country's average rainfall is roughly 20 centimeters (7.9 inches) per year. In contrast, San Francisco receives about 20 centimeters of rain in just 2 winter months.<sup>200</sup> Since 1970, however, Jordan's rainfall has averaged a mere 10 centimeters (3.95 inches) per year.<sup>201</sup>

Jordan's water deficit will have a particularly hard impact on the municipal, industrial and tourism sectors of the economy. While demand for water in the agricultural sector is expected to remain fairly stable between now and 2020, demand in the municipal and industrial sectors is expected to increase by over 100% from a current demand of roughly 350 MCM/year to 757 MCM/year. Evidence of the growing need for water is that real GDP growth in Jordan has exceeded 3% in each of the last three years (1999-2001) with the largest gains occurring in the manufacturing and services areas.<sup>202</sup> As a result, Jordan must augment its water supply in order to keep pace with expected demand across the

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<sup>200</sup> USA Today, <http://www.usatoday.com/weather/climate/usa/calif/wsanfms.htm>.

<sup>201</sup> Remarks by Dr. Barney Popkin at Bechtel, San Francisco, Fall 2002.

<sup>202</sup> U.S. Department of State, *2001 Country Reports on Economic Policy and Trade Practices – Jordan*, Bureau of Economic and Business Affairs, February 2002.

country. According to Water Minister Hazem Nasser, Jordan is designing its national industrial strategy around water and its availability. He has pointed out, however, that increasing investment and industrial projects have contributed to Jordan's water crisis, and it is feared that a lack of water and its potentially high cost could discourage future investors.<sup>203</sup>

### **Is Turkish Water for Sale?**

Turkey has an abundance of freshwater from its numerous streams and rivers. The headwaters of both the Tigris and Euphrates Rivers originate in Turkey and the country is considered by some to be an emerging regional "hydro-power". Since the mid-1980's, Turkey has made several offers to sell some of its water to needy neighbors. Turkey currently ships about 6.8 MCM/year to Turkish controlled Northern Cyprus via tankerships and waterbags.<sup>204</sup>

The Manavgat River in southern Turkey is responsible for 4.5 billion cubic meters per year of freshwater runoff. The city of Manavgat, which lies on the Mediterranean near Antalya, is the site of a dam and a \$150 million dollar, 186 MCM per year freshwater treatment and transfer station.<sup>205</sup> The facility was completed in the late 1990's and is designed specifically for water exports. The Manavgat facility consists of a series of pumping and treatment stations where water is extracted from the Manavgat River and sent to either a treatment and purification plant or directly to a filling station for export depending on what the buyer specifies.<sup>206</sup> Israel recently signed a deal with Turkey that will supply it with 50 MCM/year of water each of the next 20 years.<sup>207</sup>

### **Building a Pipeline**

In 1987 a series of pipelines were proposed to transport Turkish water to its southern neighbors. The plan, dubbed the "Peace Pipeline" involved the construction of two pipelines originating near the Seyhan and Ceyhan Rivers that would transfer water to points throughout the Middle East that lie south of Turkey. This proposal was feasible in part because the combined average annual flow of the Seyhan and Ceyhan Rivers 15.19 billion cubic meters. A portion of this water is utilized along the course of the rivers while the rest drains into the Mediterranean Sea.<sup>208</sup> The original Peace Pipeline was to originate at the Seyhan and Ceyhan Rivers and consist of a 6,550 km dual-line system

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<sup>203</sup> *Jordan Times*, 27 November 2002.

<sup>204</sup> "Turkey thirsts to export excess water; Mideast: Sales to other countries in the parched region could boost its power as well as income", *The Los Angeles Times*, 6 August 2000.

<sup>205</sup> *World Tribune.com*, 2 September 2002.

<sup>206</sup> "Turkey thirsts to export excess water; Mideast: Sales to other countries in the parched region could boost its power as well as income", *The Los Angeles Times*, 6 August 2000.

<sup>207</sup> "Israel-Turkey strike 20-year water deal", *Associated Press*, 7 August 2002.

<sup>208</sup> Mehmet Tomanbay, "Turkey's Approach to Utilization of the Euphrates and Tigris Rivers", *Middle East Quarterly* Volume 22, Number 2, Spring 2000. Pg. 85. Actual data from State Hydraulic Works, *Turkey's Hydroelectric Energy Potential and Current Situation*, Ankara 1998.

with a capacity of 6 MCM/day (MCM) at a cost of roughly \$21 billion.<sup>209</sup> This massive network was to extend from southern Turkey to Syria where it would split into western and eastern branches with the western branch serving the Levant and western Saudi Arabia and the eastern branch serving eastern Saudi Arabia, Kuwait, Bahrain, Qatar, the United Arab Emirates, and Oman.<sup>210</sup> While technically feasible, this project never made it out of the planning stages.

The Water Solutions Group suggests that Jordan pursue the construction of a smaller version of the original peace pipeline that would deliver water from the Seyhan and Ceyhan Rivers to Amman via Syria. This pipeline, if built with a capacity of 1 MCM/day, would erase Jordan's expected water deficit of 360 MCM through 2020 and provide adequate supplies of water for years to come.

### **What are the Alternatives to the Seyhan/Ceyhan Pipeline?**

Desalination is the method of choice for supplementing water supplies in most Middle Eastern countries. Saudi Arabia has had great success producing desalinated water, but this is only because it has access to oil, a vital component in the energy intensive desalination process. Desalination is an expensive proposition for Jordan as it would require the importation of large quantities of oil, and desalinated water would then have to be pumped roughly 325 kilometers north to Amman for consumption. Although feasible, enormous capital costs and long term operation and maintenance costs make this option cost prohibitive.

Shipping water from Turkey to Aqaba and then pumping it to Amman eliminates the need for large quantities of oil, but shipping costs are very high making this option undesirable. If Jordan purchased water from Turkey and shipped it to Aqaba it is estimated that the cost to deliver each cubic meter of water would quadruple current costs. Jordan simply cannot afford this.

The Red-Dead pipeline is another option under serious consideration for supplementing Jordan's freshwater supply. This project entails a pipeline system originating in Aqaba and terminating at the Dead Sea to refill the shrinking Dead Sea, provide desalinated water to Amman, the West Bank and Jerusalem, and generate electricity. The cost of this project is enormous, nearly \$4 billion, and heavy long run costs would be incurred to replace desalination plants as they burn out. The cost of this project and uncertainty about negative environmental externalities make this option less attractive than a simple pipeline from Turkey.

### **Can Jordan Afford a Pipeline from Turkey?**

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<sup>209</sup> United Nations University, "Managing Water for Peace in the Middle East", [www.unu.edu/unupress/unupbooks/80858e/80858E04.htm](http://www.unu.edu/unupress/unupbooks/80858e/80858E04.htm)

<sup>210</sup> Mostafa Dolatyar and Tim S. Gray, *Water Politics in the Middle East*. (USA, St. Martin's Press, Inc. New York, 2000). Pg. 195.

Although exact costs cannot be determined without comprehensive feasibility studies, the Water Solutions Group has created the following chart to display potential costs of the Seyhan/Ceyhan pipeline and competing alternatives. Costs are based on a per cubic meter figure as this is a fairly accurate way to determine per unit production and delivery costs. Potential high and low costs are displayed based on available construction and operating information. For a comprehensive breakdown of these costs and how they were derived, please see “A Strategy for Building a Freshwater Pipeline from Turkey to Jordan” published by the Water Solutions Group. Cost estimates are broken into the first 30 years of each project and the final 70 years of each project for a total of 100 years which coincides with the expected life expectancy of the Seyhan/Ceyhan pipeline.

**Comparative Costs for Water  
(0-30 Years)**

Source of Water	Cost per Meter <sup>3</sup> from Turkey (A)	Cost per Meter <sup>3</sup> to Deliver (B)	Total Cost per Meter <sup>3</sup> (A+B)
<b>Seyhan/Ceyhan Pipe</b>	<b>\$0.05 - \$0.23</b>	<b>\$0.33 - \$0.68</b>	<b>\$0.38 - \$0.91</b>
Red Dead Pipeline	\$0.00	\$0.50 - \$0.65	\$0.50 - \$0.65
Desalination	\$0.00	\$0.75 - \$0.95	\$0.75 - \$0.95
Waterbags <sup>211</sup>	\$0.05 - \$0.23	\$0.93 - \$1.13	\$0.98 - \$1.36
Tankerships <sup>212</sup>	\$0.05 - \$0.23	\$4.82 - \$5.02	\$4.87 - \$5.25

**Comparative Costs for Water  
(31-100 Years)**

Source of Water	Cost per Meter <sup>3</sup> from Turkey (A)	Cost per Meter <sup>3</sup> to Deliver (B)	Total Cost per Meter <sup>3</sup> (A+B)
<b>Seyhan/Ceyhan Pipe</b>	<b>\$0.05 - \$0.23</b>	<b>\$0.06 - \$0.13</b>	<b>\$0.11 - \$0.36</b>
Red Dead Pipeline	\$0.00	\$0.50 - \$0.65	\$0.50 - \$0.65
Desalination	\$0.00	\$0.63 - \$0.68	\$0.63 - \$0.68
Waterbags <sup>213</sup>	\$0.05 - \$0.23	\$0.81 - \$0.86	\$0.86 - \$1.09
Tankerships <sup>214</sup>	\$0.05 - \$0.23	\$4.70 - \$4.75	\$4.75 - \$4.98

<sup>211</sup> See Commercial Diplomacy Master’s Project completed by Keith Spain at the Monterey Institute of International Studies, “Recommendations for the U.S. Trade Representative to Negotiate Trade Rules with Canada Governing Bulk Water Exports”, 30 June 2002. Pg. 51.

<sup>212</sup> This figure is based on a tankership carrying 75,000 cubic meters of water at a daily cost of \$35,000 per day for ten days (approximate roundtrip transit time from Turkey to Aqaba) plus \$0.70 per cubic meter to pump the water from Aqaba, Jordan to Amman for consumption. CHECK THIS

<sup>213</sup> See Commercial Diplomacy Master’s Project completed by Keith Spain at the Monterey Institute of International Studies, “Recommendations for the U.S. Trade Representative to Negotiate Trade Rules with Canada Governing Bulk Water Exports”, 30 June 2002. Pg. 51.

<sup>214</sup> This figure is based on a tankership carrying 75,000 cubic meters of water at a daily cost of \$35,000 per day for ten days (approximate roundtrip transit time from Turkey to Aqaba) plus \$0.70 per cubic meter to pump the water from Aqaba, Jordan to Amman for consumption.

As the data indicates, the Seyhan/Ceyhan pipeline is very cost competitive and the cost per cubic meter of water after the initial 30 years of operation are dramatically lower than those of alternatives. For example, in the first 30 years the Seyhan/Ceyhan pipeline could deliver water anywhere between \$0.38 and \$0.91 per cubic meter. This is competitive with alternatives, however costs drop to anywhere between \$0.11 and \$0.36 per cubic meter after the initial 30 years of operation. This is by far the most cost effective option in light of alternatives such as desalination, shipping water, and the Red-Dead pipeline.

In order for Jordan to make the Seyhan/Ceyhan pipeline cost effective it must collect enough revenues from water consumers in Jordan to cover pipeline costs. In conjunction with efforts by the World Bank, the Water Authority of Jordan is implementing a new pricing scheme and collection measures to improve the financial viability of the Water Authority in the future. The new pricing scheme would ensure that more than enough revenues would be collected from Jordanian consumers to cover pipeline costs and even bring in additional funds each successive year that the pipeline is in operation. In effect, the Seyhan/Ceyhan pipeline could be a revenue generator for the government of Jordan, thus transforming the Jordanian water sector from a resource draining liability to a revenue generating asset.

### **Is a Pipeline Feasible Given Political Realities?**

Cooperation between Jordan, Syria and Turkey are essential if the Seyhan/Ceyhan pipeline is to become a reality. While all three of these countries have had strained relations in the past, the last several years have seen dramatic steps by all three to strengthen relations at the political, economic and military levels.

In recent years, Syria's government, lead by the young Bashar al-Assad, has gone to great lengths to improve Syria-Turkey relations, however the two countries have a long history of tension. Consistently complicating matters between Syria and Turkey is Syria's outrage at Turkey over its limiting the flow of desperately needed Euphrates water. At one point, in early 1990, Turkey reduced the flow of the Euphrates to a trickle for an entire month to fill the catchment area behind the recently completed Ataturk Dam.

In February 1996, Turkey and Israel signed a bilateral military accord that the Syrian Defense Minister, Mustapha Tlass, referred to as a "satanic" alliance.<sup>215</sup> Syria, becoming increasingly isolated politically, feared that the combination of a Jordan-Israel peace and a Turkish-Israeli military alliance would put them in a vulnerable position both politically and militarily.

In 1998 relations between Syria and Turkey hit a low-point. At this time, the two sides nearly went to war with each other over Syria's support for Abdullah Ocalan, then leader of the PKK, a Kurdish separatist group seeking independence for Kurds living in southeast Turkey. In October of that same year, tensions escalated to the point that the Chief of Turkey's General Staff was quoted as saying that an "undeclared state of war" exists between Turkey and Syria largely due to the issue of the PKK. Further reports by

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<sup>215</sup> "Turkish PM warns Syria that Army awaiting orders", *AFP Ankara*, 3 October 1998.

the Turkish press indicated that Turkish troops were being sent to the Syrian border, and Turkish Prime Minister, Mesut Yilmaz, warned Syria that the Turkish army was “awaiting orders” to attack.<sup>216</sup> The threat of hostilities persisted and Egyptian President Hosni Mubarak was called upon to intervene. Tensions were finally diffused after the governments of Ankara and Damascus signed an accord mediated by Egyptian and Iranian diplomats. Although war was averted, and Abdullah Ocalan was eventually expelled from Syria and arrested, tensions over water persisted.

### **Benefits to Syria by Hosting the Pipeline:**

Turkey’s GAP project could further exacerbate tensions between Turkey and Syria. And although Syria was included in the initial peace pipeline proposal in 1987 as a transit country and beneficiary of water, any water agreement involving Turkey may be viewed with skepticism. However, permitting the Seyhan/Ceyhan pipeline to transit Syrian territory could result in the following benefits directly to Syria;

- Employment opportunities for Syrians at pumping stations and with contractors performing routine maintenance on the system.
- Foreign Direct Investment brought by construction contracts and related services.
- A source of revenue in the form of transit fees.
- Stronger economic relations with both Turkey and Jordan which could translate into stronger political relations between the three countries.
- A source of water for the cities of Aleppo and Damascus.

Syria’s reluctance to hosting a water pipeline would likely stem from its ongoing dispute with Turkey over the Euphrates. It would be ironic for Syria to host a pipeline carrying Turkish water for profit, albeit from rivers other than the Euphrates, when one of the main points of contention between Turkey and Syria continues to be water. Syria might not be willing to allow the Seyhan/Ceyhan Pipeline to transit its territory simply because of the precedent it might set. In the coming years Turkey may contend that if Syria wants Turkish water, whether from the Euphrates or any other source, it can buy it just like Israel and Jordan. While it is illegal under international water law for a country to sell water to a downstream riparian from a river that is shared by the two, there is no guarantee that Turkey would not further reduce the flow of the Euphrates to force Syria into purchasing exported water. Syria’s acceptance of the Seyhan/Ceyhan Pipeline would likely be contingent upon explicit language embodied in a transit agreement stating that it is acting merely as a conduit for the transit of Turkish water to Jordan and that the presence of Turkish water in Syria as a result of the pipeline has no bearing on the amount of water Turkey is obligated to provide Syria via the Euphrates River.

Despite a strained past, Turkey - Syria relations began to improve in 2000 with the change of leadership in Syria and the visit of Turkey’s President to Damascus for the funeral of Hafez Al-Assad. The signing of two military cooperation agreements between

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<sup>216</sup> “Turkey in undeclared state of war with Syria, top commander says”, *AFP Ankara*, 2 October 1998, and “Turkish PM warns Syria that Army awaiting orders”, *AFP Ankara*, 3 October 1998.

Turkey and Syria in June 2002 led Turkey's Chief of Staff to remark that "A new era will be opened in the relations between Turkey and Syria with military cooperation".<sup>217</sup> This is likely to prove true as the two military agreements between Turkey and Syria indicate a delinkage of the Euphrates issue with other interests. Great strides to mend relations have been taken by both sides and the fact that Syria's young president cannot afford to isolate Syria in the same way his father did for so many years may lead to even greater efforts to engage Turkey in the future. In addition, President Assad has enacted measures to boost trade with neighbors including the signing of free trade agreement with Jordan and Iraq.

### **An Improvement in Syria and Jordan Relations from the Syrian Perspective:**

By signing the 1994 Peace Treaty with Israel, the bargaining positions of Syria and Lebanon in the face of Israel were weakened as the unified front of Jordan, Syria and Lebanon had now been split. This led to a strain in relations between King Hussein and Hafez Al-Assad. Relations began to improve in 1999 immediately following the death of King Hussein, Jordan's monarch for 46 years. President Assad of Syria, who had not set foot in Jordan for five years, made a surprise showing at King Hussein's funeral, opening the door to a new era in Syria-Jordan relations.<sup>218</sup> Additionally, Bashar al-Assad, the heir apparent to his father in Syria, was placed in charge of the Jordan file roughly a year prior to his father's death, an indication of the importance relations between the two countries would play after the elder Assad's passing.<sup>219</sup>

After the death of King Hussein, Jordan's new king, Abdullah, visited Syria just two months after ascending to the throne. During his highly publicized visit to Damascus, Syrian President Hafez al-Assad told King Abdullah that he was opening a "new chapter" between the two countries.<sup>220</sup> Issues that were immediately addressed included economic cooperation and water. An area of dispute between the two countries has been the management of the Yarmouk River which originates in Syria, crosses into Jordan, and empties into the Jordan River. Syria has built numerous dams on its upstream portion of the river to the detriment of Jordan.

In the past two years, relations between the two countries have improved to the point that a free-trade agreement was signed in 2001 and construction has begun on the \$136 million al-Wihdeh dam on the Yarmouk River. The al-Wihdeh dam will stop the flow of a portion of the Yarmouk River on the Jordan-Syria border and provide water for both agricultural and municipal use in Jordan. As previously agreed, Syria will not have access to any of the water resulting from this project as Jordan is paying for the construction of the dam in its entirety, and Syria does not rely as heavily as Jordan on water from the Yarmouk River.<sup>221</sup>

<sup>217</sup> Nicholas Blanford, "Syria forms new alliances", *The Christian Science Monitor*, 26 June 2002.

<sup>218</sup> Caroline Faraj, "King begins 'historic' visit to Syria today", *Jordan Times*, 12 April 1999.

<sup>219</sup> Ibid.

<sup>220</sup> Abdullah Hasanat, "King holds 'positive' talks with Assad. Landmark visit opens 'new chapter' in Jordan-Syrian relations – Syrian president," *Jordan Times*, 22 April 1999.

<sup>221</sup> "Turkish company wins water pipeline contract", *Jordan Times*, 30 July 2002.

In August of 2001 steps toward further strengthening relations between Syria and Jordan were taken when Syrian authorities permitted the circulation of independent Jordanian newspapers on the highly controlled Syrian market for the first time in 20 years. Prior to this, only one Jordanian newspaper was permitted in Syria as its ideology was in line with those of former Egyptian president and pan-Arab proponent Gamal Abdul-Nasser. The opening of the Syrian newspaper markets was preceded by a similar step taken by the Jordanian government to allow the circulation of Syrian papers in Jordan.<sup>222</sup> Overtures such as this are small steps in a larger effort to further integrate the two countries socially and economically. Due to common economic and political interests, a shared Arab identity, and a dramatic improvement in relations between Jordan and Syria since 1999, the political environment appears capable of supporting the Seyhan/Ceyhan pipeline project.

### **Recommendations**

- **Build the Seyhan/Ceyhan pipeline:** Jordan's freshwater situation has reached a critical level and the Water Solutions Group believes that, given alternatives, Jordan should pursue the construction of the Seyhan/Ceyhan pipeline to complement its water supply.
- **Follow through with tariff collection reforms:** Jordan should continue reforming its tariff collection mechanism with the assistance of the World Bank. If a stable, enforceable tariff collection mechanism is in place, the pipeline will pay for itself in the long-term and actually become a source of revenue for the Water Authority of Jordan.
- **Continue implementing current water saving measures:** Access to freshwater from Turkey is not an excuse to waste current resources or avoid looking for ways to conserve water. Even with the Seyhan/Ceyhan pipeline Jordan will need to be diligent about maximizing all of its water resources efficiently. This includes current efforts to replace the municipal water infrastructure in Amman and developing greater wastewater re-use capacity.

### *Annex 2*

#### **A REGIONAL PEACE?**

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<sup>222</sup> "Syria permits the circulation of Jordanian papers", *Arabic News.com*, 8 August 2001.

Observers to the Middle East water situation point out that in the event of a regional peace, namely the inclusion of Syria and Lebanon in a settlement with Israel, water will be a factor of serious negotiations. The 1994 Israel-Jordan Peace Treaty includes provisions on water, and a wider agreement inclusive of Israel, Syria, and Lebanon will likely address the issue of water.

Language in the 1994 Israel-Jordan Peace Treaty regarding water pertains only to Israel, Jordan, and the Palestinian Territories, specifically the West Bank. In the event of a broader peace treaty inclusive of Syria and Lebanon the tributaries that feed the upper Jordan River in Syria and Lebanon and the Yarmouk River would be an issue of negotiation. The Sea of Galilee and other basins in the occupied Golan Heights would be on the agenda as well. Syria does not heavily depend on these sources of water as most Syrian agriculture activity and major cities are located farther north.

If a broader peace settlement came about after the construction of the Seyhan/Ceyhan pipeline, Israel might look into ways to benefit from some of this water. Presently, Syria must weigh its policy decision to cooperate on the construction of the pipeline knowing that it may eventually serve as a conduit for water destined for Israel. This would not likely be a popular position for the Syrian government to take. However, Israel's gaining access to pipeline water might provide it with an incentive to return part of the Golan Heights around the Sea of Galilee to Syria. Israel is currently very dependent on these waters and the Sea of Galilee is an integral element in the overall strategy to maintain control over the Golan Heights.

A peace settlement involving the return of the Golan Heights and the Sea of Galilee to Syria in exchange for security and pipeline water from Turkey would put Israel in a highly dependent position as Israel would have to rely on Syria and Jordan to allow pipeline water to arrive in Israel without interruption. It is unlikely that Israel would agree to such an arrangement unless they had already developed an alternative source of water. In this case, agreement on the pipeline could be viewed as an intermediary step and as a confidence building measure. In addition, if the pipeline were to supply Palestinian controlled areas in the West Bank with water, this would potentially free up aquifer water for Israel to have sole access to as it is currently being shared, albeit on a limited basis, with Palestinian communities in this area.

Whatever the outcome, it is likely that water will be a key component in any type of regional settlement involving Syria due to the strategic location of the Golan Heights and the water resources located there that Israel is dependent on. The Seyhan/Ceyhan pipeline, while not a "fix all" to the regions water crisis could play an integral role in alleviating at least some of the pressure off of water deprived countries and act as a conduit for cooperation between historic enemies.