Middle East Water Conflict: The Battle Over the Al-Disi Aquifer
by: Benjamin R. Long

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I. CASE BACKGROUND

1. Abstract
Ironically, the Middle East’s most sought after resource is not crude oil, but water. With precious few rivers and lakes to obtain fresh water for their populaces, Middle Eastern countries have turned to other methods of obtaining water. One such method is to search out and drain deep underground water aquifers. The al-Disi aquifer is a deep aquifer that lies beneath the border between Jordan and Saudi Arabia. The al-Disi is a sandstone aquifer believed to be about 320 kilometers long and is the largest of its type in the region. There have been debates by the two countries over the rights to draining, the extent of draining, and the regulation of draining the al-Disi aquifer. As the already arid environment of the Middle East is exacerbated by growing populations and agriculture, the potential for conflict becomes greater. This case study discusses the potential of conflict and resolution between Jordan and Saudi Arabia over the al-Disi aquifer, and its relationship to the environmental conditions of the Middle East.

2. Description
The role of water in the Middle East is a crucial one. Not only is it a sustenance for life, but it is also critical in industry and agriculture. The Middle East makes up 5% of the world’s population, while the region’s access to water is limited to 9% of the world’s water resources. Because of water’s scarcity in the region it is a topic of political and environmental concern. Politically, states must decide who owns what water. Often rivers and lakes are the borders of states, causing debate over who has control of the river as a
resource. Furthermore, conflict can occur when water upstream may be polluted or overused, leaving what is left for countries downstream [ref: Attaturk Dam ICE case, Bluenile ICE case]. However, international disputes over large underground aquifers have been largely ignored due to the pressing questions of environment, international law, economics, and politics. Coupled with the effect of water scarcity in the region, these questions must be answered urgently and satisfactorily to maintain peace and stability in the region.

The al-Disi aquifer is located in the Arabian peninsula and, although most of its mass lies underneath Saudi Arabia, a section also lies underneath Jordan. It is a deep sandstone aquifer that 320 km long and is the largest in its region. By being locked within non-porous sandstone rock the aquifer is not subject to recharging by rainfall. It is largely unknown how much water the aquifer contains or its archeological history. What is known is that the water in the al-Disi is not rechargeable and is quite old (ie. 20,000-30,000 years old). The al-Disi is currently drained to support the production of agricultural products (ie wheat, discussed later in the case study), but this is a relatively new occurrence, as desert production of agricultural goods by both Jordan and Saudi Arabia started in the 1980's. Furthermore, there is no agreement between the countries concerning the al-Disi and its usage.

The conflict over the al-Disi is a relatively new one. The al-Disi was not a focus of Saudi Arabia and Jordan until the population growths and water shortages of the late 20th century began to put new pressures on the two countries. Jordan is the smaller country of the two geographically and economically. The majority of the al-Disi lies under Saudi Arabia as well, therefore, Jordan has largely viewed itself as the victim of Saudi Arabia's bullying and overuse of the aquifer. Jordan, as a result, has gone to he U.N. for assistance. It signed onto the U.N. Convention on Non-Navigational Uses of International Watercourses, the most relevant international agreement to the ala-Disi. To date, Saudi Arabia has not signed the treaty, leaving the conflict unresolved with no foreseeable resolution in sight.

In this paper I will discuss the environmental, political, economic, and legal questions over underground aquifers, specifically concerning the al-Disi. Questions to be answered are which country owns the aquifer? What environmental consequences are there for draining the aquifer? What legal documents or precedents are set for non-navigable water sources? What is the nature of the economic relationship between Jordan and Saudi Arabia and what role will that play in the fight for the al-Disi?

3. Duration
1990-present

4. Location
Continent: Middle East
Region: Asia
Countries: Saudi Arabia and Jordan

5. Actors
Saudi Arabia and Jordan

II. Environmental Aspects

Environmental Data
In Saudi Arabia farmers have problems growing their products and, thus, sustaining themselves. The problem is not the lack of available land or the threat of big companies buying them out, problems which may overwhelm U.S. farmers. The problem is the lack of available water. Saudi Arabia is 90% desert and has no rivers or lakes to use as water sources (Smith 1).

Farmers in Saudi Arabia have found and drawn on water aquifers beneath the ground to maintain their vast irrigation systems. Aquifers, however, do not renew themselves at the same rate as they are being drained if at all. Shallow aquifers lying above 1,300 feet are replenished by infrequent and brief rains. Aquifers at this depth are embedded in porous rock, which allows for groundwater to seep through the rock and replenish the aquifer, otherwise called recharging. However, aquifers deeper than that are in between solid layers of rock and, thus, non-renewable. These waters are commonly called fossil waters (Smith 2).
As a result of the Saudi Arabian water shortage when one travels by plane over Qassim province, the breadbasket of Saudi Arabia, they can see lush circular wheat farms with powerful 4000 foot sprinkler systems, but, unfortunately, they can also see the dried up circular imprints of former farms that ran out of water available in underground aquifers and were forced to shut down. The wheat program in Saudi Arabia started in the early 1980’s, primarily for the purpose of weening the Saudi population off dependance on European wheat. The cost to produce high yields of wheat in the desert are high. Wheat farmers are subsidized at nearly five times the world market for their product, which allows them to establish expensive irrigation systems. Subsidies also allow Saudi wheat to compete on the world market and produces some income for the state. Since 1997, however, the Saudi government began to curtail their wheat output to subsistence levels within Saudi Arabia [ref: Saudi wheat TED case]. Regardless, seventy percent of the water used for the wheat program has been non-rechargeable fossil water. One Qassim province wheat farmer, whose aquifer is 4000 feet deep and non-renewable, noted, “I’ve had to lower my pumps 300 feet in the last 10 years” (Smith 2). Furthermore, as farmers deplete the aquifer, a result known to organic chemists as “salting out” occurs. This is a process in which unwanted minerals and salts begin to seep into aquifer water and decrease its purity. A high content of minerals in water renders it less effective for growing crops (Jones 1). This anonymous wheat farmer, and many others like him, will have worsening conditions to grow crops unless depletion of the aquifer is stopped. One solution to the al-Disi depletion problem is for Saudi Arabia to cease production of wheat, and other water sapping agricultural goods, and restructure their economies around products in which they have a comparative advantage on the world market.

One non-rechargeable fossil aquifer used by wheat farmers in the Qassim province is the al-Disi aquifer. The al-Disi aquifer, which is the most extensive aquifer in the Arabian peninsula, is located in the western portions of Saudi Arabia and crosses underneath the border into Jordan. Musa Hantash, the Jordanian water secretary, stated that the, “al-Disi should be protected as national wealth for coming generations,” because of its size and value to the arid region. It is a deep, non-recharging, non-porous sandstone aquifer. Scientists are not positive at what rate recharging occurs, but water extracted from the al-Disi at different locations is 20,000-30,000 years old, which places the last recharging of the aquifer in the early Paleolithic period. This fact carries no archealogical signifigance, however, there is 10,000 years of hydraulic gradient, which suggests the al-Disi has been recharged in the past, however, the current theory on recharge is that it may have occurred at one time in ancient outcrops of the aquifer that no longer are capable of replenishing the aquifer (Murakami 94). At any rate of recharge, the al-Disi aquifer is still being drained quicker than it is capable of recharging itself.

Water shortage and aquifer depletion is not just a problem for Saudi Arabian farmers but also for the entire Middle East region. As stated in the description, the region is woefully short on water supplies compared to its population. The Middle East went from having three countries on the water scarce country list (Jordan, Bahrain, and Kuwait) to 11 by 1990 (including Saudi Arabia). The problem is exacerbated by high rates of population growth in the region. At 423 million people in 2000 and a growth rate of 2.5% annually, the region is expected to double its population by 2025 (Brooks 3).

In the Middle East region an average of 50-90% of any nation’s water is used for irrigation in agriculture. Some of the techniques of irrigation are not conducive to water conservation. For instance, in Saudi Arabia the high powered sprinkler systems lose water because they are susceptible to evaporation into the arid air. As a result, a large amount of water is wasted by never reaching the roots of the plants. Drip irrigation technology that allows for water to be applied directly to the roots of plants drastically reduces evaporative effects (Brooks 4). Furthermore, the plants chosen by Middle Eastern governments for growth by subsidy often require high amounts of water. Wheat, for example, requires high amounts of water for growth and most of the growth is in the stalk and roots and not in the usable grain. Alfalfa, another plant chosen by some governments to grow, consumes four times the amount of water as wheat (Smith 4).

Rainfall is the most obvious way to replenish resources of water. Rainfall in the Middle East is highly variable and ranges from 1000mm/year to practically 0mm/year. When studying rainfall in the region it is more relevant to understand the spatial, seasonal, and annual aspects of rainfall. Much of the Middle East lies in a transition zone. The northern parts of the region receive higher amounts of rain and sometimes experience drought and the southern parts receive less rain but sometimes experience flooding. In the middle, which includes the semi-arid countries (ie Iraq, Jordan, Syria) there is a zone of unpredictability where there is flooding and drought (Brooks 2).

The region, especially the Arabian peninsula, has turned to expensive techniques to maintain their water supplies, such as desalination plants, which use steam and condensation to rid brackish water of salt and
other minerals, and extensive hydrological building projects like dams and treatment plants. The resulting use of income has put a stress on economies that are already largely underdeveloped (Brooks 4). Jordan, also, has no geographic access to proper sites for these techniques to be installed [ref: trade data]. Furthermore, these processes have not reversed the shrinking water supplies, rather, they have just slowed them down.

The Middle Eastern region is experiencing environmental stresses due to the problem of water scarcity. Water scarcity has been exacerbated in the region by the non-rechargeable nature of its aquifers, its high population growths, its lack of funds or geographic positioning to maintain expensive techniques for increasing water supply, and its highly variable rainfall. These conditions raise the potential of conflict over resources such as the al-Disi, which are growing in importance. Middle Eastern countries eventually will be left no choice but to begin developing cooperative techniques to deal with the environmental stress of water shortage and depletion. As in the case of the al-Disi, underground aquifers play a major role as a Middle Eastern water source. If Jordan and Saudi Arabia can solve their environmental scarcity problems concerning the al-Disi aquifer cooperatively, it will be a significant step on the path to preventing conflict over these resources.

6. Type of Environmental Problem
Resource Scarcity/Water Shortage

7. Type of Habitat
Arid

8. Act and Harm Sites:
Act Sites:
Jordan
Saudi Arabia (most likely)
Harm Sites:
Jordan (most likely)
Saudi Arabia

NOTE: Jordan is the most likely to be negatively affected by the use of the al-Disi. Not only is a large majority of the aquifer underneath Saudi Arabia, but Jordan is a geographically smaller and economically weaker nation with little power to pressure the powerful and wealthy Saudi Arabian government [ref: Trade Data/Description]. Hence, Jordan is most at risk to be harmed by a decision. However, the draining of the al-Disi inevitably depletes both countries of a resource, so both countries can be considered harm sites.

III. Conflict Aspects

Legal Issues and the Conflict

Jordan has accused Saudi Arabia of misusing the Al-Disi aquifer. Because the Al-Disi aquifer lies beneath Jordan and Saudi Arabia, it is an international legal case. Unfortunately, unlike domestic law enforced by a nation-state's formal, agreed upon justice system, international law has no institution that has complete jurisdiction and enforcement powers over international legal disagreements. Nevertheless, international law is made through certain processes or institutions in the international community designed to decide on cases of international origin, such as the Al-Disi aquifer. To understand the potential for legal conflict over the Al-Disi, one must first understand the nature of these processes and institutions and what role they can play in resolving the Al-Disi dispute.

International law is made through three processes: custom, general principles, and treaties. Customs are international practices done under the belief that they are law. General principles are international practices accepted in the domestic law of all civilized states. Treaties are agreements between two or more nations
The dispute over the Al-Disi is not applicable to general principles, because rules on the usage of aquifers are not central to the domestic law of every nation-state. Saudi Arabians and Jordanians use custom to resolve issues concerning water usage. In fact, Shari'a law (or Islamic law) stems from a word meaning the sharing of water. The term arises from the ancient and vital customs on the fair and equitable use of water. Thus, these customs, so essential for life in the dessert, also became integrated into the religious culture of the Middle East, and have been around for thousands of years. Rules, such as those who dig a well have first right to usage but cannot deny the use, for drinking, to man or beast, exist to resolve disputes over water usage and maintain understanding and peace among people in the region (Darwish 1994). In the case of the al-Disi, however, the national governments of Jordan or Saudi Arabia may be inclined to ignore these customs to serve their own citizens or policies. Jordan has already accused Saudi Arabia of unfair usage of the aquifer. Therefore, custom alone will not suffice for resolution of the Al-Disi aquifer.

Treaties between Jordan and Saudi Arabia seem to be the most applicable way to solve the Al-Disi dilemma. Presently, however, it seems unlikely that the two countries will come to a bilateral agreement. Saudi Arabia has largely ignored Jordan's complaints about its misuse of the aquifer (Darwish 1994). Moreover, there is no precedent set for such a bilateral agreement on deep un-rechargeable aquifers and, consequently, no case study for the two countries to follow onto an agreement about the Al-Disi.

Treaty-making international bodies, such as the United Nations, supply the next possible source of conflict resolution for these two countries. The U.N. can facilitate agreements between member nations through resolutions (or conventions) passed by the General Assembly. General Assembly resolutions are passed by a vote of all member nations. The Security Council can also pass resolutions on issues pertaining to global security. The security council is made up of 5 permanent members, U.S., China, Russia, France, and the United Kingdom. The ten remaining members of the Security Council are rotating countries. Security Council resolutions can sometimes have enforceable measures, such as in the Persian Gulf War, in which mandate was given to liberate Kuwait with force from Iraqi forces. Both Jordan and Saudi Arabia are members of the U.N. General Assembly and are eligible for Security Council rotating seats.

Resolutions that arise out of these institutions are often powerless to enforce their legal decisions on nation-states. The United Nations Charter protects member states' sovereignty. Article two of the U.N. Charter maintains, “...the principle of sovereign equality of all its members,” as well as stating that countries “...shall fulfill in good faith the obligations assumed to them in accordance with the present Charter” (U.N. Charter). Thus, in accordance with its own charter, the U.N. cannot enforce its lesser legal jurisprudence on the sovereign nation-states of the world except through each state's understanding and fulfillment of the good faith clause. Therefore, if states disagree with the resolutions of the U.N. General Assembly or Security Council and determine they are infringements on their sovereignty, they have the right to reject such notions and not sign or ratify resolutions. In the case of the al-Disi, this means that Saudi Arabia and Jordan can reject any resolution passed by the General Assembly.

However, the 1997 U.N. Convention on Non-navigational Uses of International Watercourses, adopted by the U.N. General Assembly, addresses the issues of watercourses shared by more than one country. Watercourses are defined in Article two of the convention as “…a system of surface waters and groundwaters constituting, by virtue of their physical relationship, a unitary whole and normally flowing into a common terminus” (UNCNUIW 1997). The Al-Disi aquifer's qualification as a watercourse is questionable. It is a groundwater resource, but its nature as a deep, non-rechargeable aquifer lying in non-porous sandstone does not allow for flowing into a common terminus or unifying with surface waters. Despite this technical definition problem, the convention's principles could still apply to the sharing of the Al-Disi aquifer.

The convention calls for equitable and reasonable use of international watercourses. Furthermore, in the event of conflict over a watercourse, parties to the convention must bestow special regards to vital human needs in their resolution to the conflict. The convention also asks parties to take into account “geographic, hydrographic, hydrological, climatic, ecological, and other factors of a natural character,” when resolving conflict on watercourses (Hunter et al. 1992: 836). Parties to the convention are required to consider the environmental consequences of any uses of watercourses. Because the Al-Disi is non-rechargeable, its draining could result in salinization or “salting effect,” and/or the permanent drying up of the aquifer. This situation would be adverse to the environmental conditions of both Saudi Arabia and Jordan and are impending factors in any resolution on the matter.

The convention requires ratification by 35 countries before it can take affect. At present, the convention has been ratified by only seven countries and signed by only 18, keeping the treaty from going into affect.
Interestingly, Jordan is one of the ratifiers of the convention, but Saudi Arabia is not (Wouters 2000). Jordan is smaller economically and physically than Saudi Arabia, therefore, the Jordanian government is more inclined to utilize the U.N. as a third party to increase its power in the negotiations over the al-Disi. Despite its failure to become ratified and Saudi Arabia's decision to not sign the document, the convention is the most relevant international law for the resolution of the al-Disi conflict. It is the only written law about the use of water resources. At the very least the convention could be a model for a future bilateral agreement between Jordan and Saudi Arabia.

The International Court of Justice is another U.N. institution that could potentially resolve the issue of the Al-Disi aquifer. Member countries that are party to a case, however, must all agree to present the case before the ICJ. Member countries have historically, adhered to the ICJ's decisions on cases. Therefore, if Jordan and Saudi Arabia agreed to have the case heard before the ICJ a resolution would likely result. Furthermore, the ICJ has already upheld the principles of the UNCNUIW in the Danube River case (www.icj-cij.org 2003).

Historically, cases heard before the ICJ are those of relatively moderate importance to nation-states. Those cases that are diminutive in importance are not pressing enough for governments to take the time and effort to present a case before the ICJ. Cases of high importance to nation-states are considered to important to let a court of foreigners decide, leaving the ICJ to hear mostly cases of moderate importance. The al-Disi aquifer has high importance to the Saudi and Jordanian governments because of water's scarcity in the region and its necessity for human subsistence (Herrick 2000). The level of importance is rising as water scarcity and populations in the region are rising. Therefore, despite nation's holding the ICJ's decisions in high regard, the likelihood of a mutual decision by Jordan and Saudi Arabia to present the case before the ICJ is negligible. Moreover, if Saudi Arabia has not signed the UNCNUIW, it is unlikely it will agree to present the case before the ICJ, which has already upheld the convention.

In conclusion, the legal aspects of the al-Disi aquifer are of international origin. In the Middle East region, custom has been used to resolve disputes over water, but the nature of the nation-state system could cause the governments of Saudi Arabia and Jordan to ignore custom for the sake of nationalistic advantages. Its own Charter limits the U.N. in its ability to resolve the situation definitively as a treaty-making international organization. However, it has developed the UNCNUIW to deal, fairly and equitably, with international water resources. Although this agreement is not yet in effect and Saudi Arabia is not a signatory, it could act as a mode to a resolution (if both countries sign the convention and it takes effect), or model for a bilateral treaty, between Jordan and Saudi Arabia in the future. The U.N. also has the ICJ to hear international cases.

**Trade Data and the Conflict**

The owners of the al-Disi aquifer, Jordan and Saudi Arabia, do not sell its water as a commodity on the worldwide water market primarily because its water is too valuable a commodity. The water pulled up from the aquifer is worth too much domestically to sell on the foreign water market. Therefore, it is hard to produce relatively non-existent trade data on the sale or import/export of al-Disi aquifer water. However, knowledge of the differences in the Jordanian and Saudi economies as well as understanding what role water plays in each economy is essential to understanding the conflict over the al-Disi aquifer.

Both Jordan and Saudi Arabia are high on the water stress list. 82.6% of Jordan's land is considered under severe water stress, while Saudi Arabia is in even greater stress with 88.3% of its land considered under severe water stress. Because of water stress the al-Disi aquifer is critical to both countries and, therefore, a site for future conflict. However, Jordan and Saudi Arabia have very different economies, which leads to different usages of water. Saudi Arabia economy thrives on the export of petroleum. Saudi Arabia's petroleum exports accounts for 75% of its budget revenues. Jordan, on the other hand, has relatively no petroleum or natural gas. Despite being close neighbors the Saudi economy ranks 30th in the world in Gross Domestic Product at approximately $241 billion, while the Jordanian economy is much smaller economy without natural resources to export and, thus, ranks 94 th in the world in GDP of $22.8 billion dollars.

Significant economic, as well as geographic, difference between the two nations has led to different strategies of maintaining and harnessing sufficient water supplies. Saudi Arabia has no rivers or lakes, but does have coastline access to the Red Sea and Persian Gulf (figure 1). Therefore, Saudi Arabia's strategies revolve around two tactics: heavy draining of groundwater sources (i.e. al-Disi aquifer) and using desalinization of seawater. Hence, Saudi Arabia has become #1 groundwater withdrawal nation at 899.3
cubic meters a year. The Saudi access to the coastline gives them access to seawater, which provides opportunity to desalinate water. Although desalination is an expensive process, the large Saudi economy can handle the cost. It allocated $1.6 billion dollars for desalination projects and currently ranks 12th in the world with 2057.25 micro-siemens/cm in desalination (nation master). In production of potable water from the sea Saudi Arabia ranks #1 in the world (Saudi Arabian government desal. Stats) Jordan, on the other hand, has relatively little access to seawater. Jordan is almost entirely landlocked except for a tiny port into the Gulf of Aqaba off the Red Sea. However, Jordan does have access to the Jordan River and Dead Sea. Hence, it uses far less ground water (i.e. al-Disi aquifer) and expensive desalinization for its water sources. Jordan ranks 43rd in the world with 1014 ms/cm produced through desalinization and only 47th in the world in groundwater withdrawals at 100.7 meters cubed a year. The result of these statistics is that Saudi Arabia, with no rivers or lakes and being a high consumer of groundwater, may covet the al-Disi and attempt to drain it more extensively than Jordan may. However, it is important to note that Jordan River is part of the West Bank. Unfortunately, in the Israeli-Palestinian conflict this water source is heavily contested (TWM website). If that water source becomes difficult to attain due to conflict, the al-Disi aquifer may play a larger role in Jordanian water resources [ref: Dead Sea TED case].

The Saudi and Jordanian governments use most water pulled from the al-Disi aquifer for agricultural purposes. The average percentage of a Middle Eastern nation's overall water used in agriculture is 86%. Both Jordan and Saudi Arabia began to farm in the 1980's using groundwater for irrigation to turn the desert into arable land. The purpose of this strategy was to decrease their dependence on agricultural commodities provided largely by the West. One such commodity chosen by both governments was wheat. Saudi Arabia became a large exporter of wheat in the 1990's, exporting at its peak 4.07 million tons in 1992. However, the oil-rich government heavily subsidizes wheat in Saudi Arabia. The subsidies cover the high expenses of central pivot irrigation and groundwater pumping. Heavy agricultural subsidies causes animosity from other agricultural countries, thus, Saudi Arabia, since 1997, has maintained a strategy of producing at self-sufficiency levels at about 2 million tons a year. Subsidies have gradually declined from their peak in 1993 at $1.87 billion (ref: TED Saudi Wheat case). Jordan, with its smaller economy, has maintained a smaller profile on the global agricultural market than Saudi Arabia. Jordan's agricultural sector accounts for only 4% of its GDP, compared to 7% for Saudi Arabia (nationmaster.com).

The last important statistic to discuss about these two countries is their trade relationship. Because Saudi Arabia exports oil to heavily oil dependent Western nations it does very little trade with its neighbors in comparison. The Saudi oil economy allows it to be more involved in the global market. Jordan has no such substantial natural resources and so it reliant on its neighbors for trade and is less integrated into the global economy. Hence, Jordan's third biggest trade partner is Saudi Arabia, which buys 5.6% of Jordan's exports. Jordan, on the other hand, is not in the top ten purchasers of Saudi Arabian exports. Because of Saudi Arabia's economic power over Jordan, it has more bargaining power in the al-Disi negotiation. Jordan, thus, has attempted to neutralize Saudi economic power by enlisting the support of the international community in the form of international agreements on water resources.

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<tr>
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<th>SAUDI ARABIA</th>
<th>JORDAN</th>
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<tbody>
<tr>
<td>Percent of land in water stress</td>
<td>88.3</td>
<td>82.6</td>
</tr>
<tr>
<td>GDP (in billions of dollars)</td>
<td>241</td>
<td>22.8</td>
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<tr>
<td>GDP rank</td>
<td>30th</td>
<td>94th</td>
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<td>Petroleum exports as % budget revenues</td>
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<td>Coastline Access</td>
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<tr>
<td>Groundwater withdrawal (in cubic meters)</td>
<td>899.3</td>
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<tr>
<td>World Groundwater withdrawal rank</td>
<td>1st</td>
<td>47th</td>
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<tr>
<td>Desalination (micro-siemens/cm)</td>
<td>2057.25</td>
<td>1014</td>
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<tr>
<td>World Desalination rank</td>
<td>12th</td>
<td>43rd</td>
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</table>
9. **Type of Conflict: Interstate**

Legal - International law has yet to determine the proper usage of deep aquifers like the al-Disi, hence, the conflict, presently, is being played out inside courtrooms [ref: legal issues section]

Economic - The effect of the al-Disi on the economies of Jordan and Saudi Arabia is substantial and could cause added tension and debate in the conflict resolution process. Saudi Arabia, for instance, requires al-Disi water to sustain its wheat production. In order to sustain use of the water from the al-Disi Saudi Arabia may be willing to use its trade advantages to influence Jordan at the bargaining table [ref: trade data, TED Saudi Wheat].

10. **Level of Conflict: Threat**

11. **Fatality Level of Dispute (military and civilian fatalities)**

None.

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IV. **Environment and Conflict Overlap**

12. **Environment-Conflict Link and Dynamics: Direct**

The growing populations in Jordan and Saudi Arabia are causing water shortages. The more scarce water in the region becomes the more valuable the al-Disi aquifer becomes to each country. Hence, the possibility of violent conflict is rising. We have already witnessed signs of conflict between Jordand and Saudi Arabia in legal and economic arenas. [There is a relevant causal diagram of the aforementioned dynamics of water and conflict in the ICE case study entitled Nile River Dispute]

13. **Level of Strategic Interest: Regional**

14. **Outcome of Dispute: In progress**

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V. **Related Information and Sources**

15. **Related ICE and TED Cases**

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<td>Attaturk Dam and Environment</td>
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<td>Blue Nile Dispute</td>
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<td>Cauvery River Dispute</td>
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<td>Nigerian Desertification</td>
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<td>Bio Bio River Dam</td>
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<td>Tigris/Euphrates River Dispute</td>
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16. **Relevant Websites and Literature**

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[Completed 12/11/2003]