

THE TRAGEDY OF THE COMMON WATERS: TOWARDS THE DEEPENING CRISIS WITHIN THE JORDAN BASIN

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ABSTRACT

This paper considers Jordan Basin waters and their present perilous state in face of mounting demands and continuing mismanagement. A consideration of the Tragedy of the Commons metaphor and the related prisoner's dilemma provides the background to the paper. We focus some attention upon the lack of proven international law properly to regulate such deepening disputes that are in evidence within the Jordan Basin. The need to adopt, properly based, joint total river basin management initiatives between the various riparian is stressed. An earnest plea is made to set aside recent mealy-mouthed UN pronouncements and recognize the importance of the "river basin" per se, and the interdependence of the various components of the hydrographic system. This in turn provides base pointers to the longer term need for a supra-state level organization to oversee environmental concerns within this most sensitive of regions.

The Jordan Basin stands as a prime example of the basic inability of international law to provide even minimal assistance in resolving deeper disputes over water use and related conflicts within such areas. This paper develops and refines the "Tragedy of the Commons" analogy to comprehend the manner in which Israel, acting in its own singular self-interest, has consistently adopted directed water entrapment initiatives, which now threaten the longer-term future of its other Jordan Basin riparian partners (see Rowley, 1993 and 1999). The insistence of the Western-capitalized Israeli state upon maintaining firm and resolute control over all waters within the "Land of Israel", East of the Jordan River, including the West Bank, the Golan Heights and Southern Lebanon, points to continuing uncertainties and deepening conflict throughout the region.

This paper is in three parts. The initial section considers and develops the Tragedy of the Commons metaphor, stressing its particular relevance to the Jordan Basin. The second section briefly-evaluates recent attempts by the UN to resolve certain of these problems relating to international river basins pertinent to the situation within the Jordan Basin. The third section presents a discussion of the river basin approach and the prime need to subscribe to a world systems model in matters relating to this use of waters in international drainage basins.

I.- BACKGROUNDS

The Jordan Basin is shared by four states: Jordan with 54 per cent of its territorial area, Israel with 10.5 per cent, Syria with 29.5 per cent and Lebanon, with the remaining 6 per cent. The outline precipitation and hydrological details of this generally semi-arid region are presented in Figures 1 and 2 respectively.

Major conflicts developed within the Jordan Basin with the creation of the State of Israel in 1948 and its early plans to divert upper Jordan waters into the Israeli National Water Carrier (NWC) Scheme (Smith, 1966). The NWC, a 432 km long canal and pipeline now transports upper Jordan water in a general south-westerly and then southerly direction through Israel towards the Negev. This has contributed to the movement of saline waters into the lower Jordan and a dramatic decline in water levels within the Dead Sea. Both the Hashemite Kingdom and Syria were understandably outraged, calling the pipeline a breach of international law. Israel continues to maintain that it has the right to do what it wants with 'its own water' (Shapland, 1997).

Various plans were set forth to agree a unified Jordan river basin - development initiative which would take into account existing boundaries and rival demands among the several riparians (Smith, 1966; Kahhaleh, 1981). However the Israeli occupation of the West Bank and the Golan Heights in the Six Day War of June 1967, and the creation of an Israeli-occupied zone in the southern Lebanon from June 1982, gives to Israel a firm control over a significant proportion of Jordan Basin waters. This all thereby neatly side-stepped the entire issue of developing firmer unified river-basin management initiatives with the other riparians (Rowley, 1999).

II.- THE COMMONS METAPHOR

Some thirty years ago Garrett Hardin considered the Tragedy of the Commons (Hardin, 1968). While the paper was but six pages in length its base themes have been recounted on numerous occasions.

Hardin's paper itself was based on an obscure pamphlet concerning population control issued in 1833 by William Foster Lloyd, a Welsh amateur mathematician. In essence the notion of the commons provides a metaphor of the anarchical nature of international society and the consequences arising therefrom.

Let us visualize a medieval English village which has a common pasture on which all the villagers are entitled to graze their livestock. The villagers continue to add to their herds so long as each individual beast yields some degree of profit. In time, however, overgrazing will completely ruin the common for all the graziers. Thus while each villager has a personal interest in continuing to add animals to the common all also have a common interest in adjusting grazing to the carrying capacity of the resource. Indeed each villager understands that if one adds just a single extra animal to the common it will not immediately result in the ruin of the common. Here there is also a 'free-rider' problem. That is, if certain villagers were to behave in an ecologically sensitive and responsible manner and withdrew livestock from the common, they would then be assuming the entire costs of conservation, whereas their selfish neighbors would reap the benefits and their animal would continue to overgraze the resource; perhaps even to the stage of its extinction.

The commons metaphor thus demonstrates the lack of coincidence between individual and collective interests (Muir, 1997, p.26). Individuals thus have a clear interest: in continuing to pillage a declining resource unless co-operative action or intervention by an external agency can impose some system of sustainable use which could benefit the entire community. The 'Tragedy of the Commons' metaphor has been applied in countless situations of resource exploitation and it may be developed to demonstrate the problems associated with a global society dominated by sovereign states. As the states are sovereign there is no dominant authority. So each state may pursue its singularly selfish interests to a point where scarce global resources become contaminated, exhausted or otherwise depleted. Thus, as with those medieval English villagers, the state's short-term interests in maximizing its take of resources may well conflict with the longer-term communal or supra-national interests in maintaining a valuable resource base. This is the essence of the problems relating to Jordan Basin waters, where the creation and quite startling growth and development of Israel into a modern industrial state within the dominantly semi-arid conditions of the Jordan Basin has placed untold pressures upon the physical environment (Rowley, 1993 and 1999).

III.- DEVELOPMENT

Hardin's essay has, however, done much to confuse two crucial aspects relating to the way in which resources are managed. Here we must make a distinction between "open access" and "common property" resources. An open access resource has no owner whereas a common property resource does have an owner, as for example a local community (Pearce, 1995).

This distinction is important for while "common property" does have some in-built risks of over-exploitation it is often a quite viable and sustainable form of resource management because the common owners mutually agree to limit use of the resource. However, under "open access" there is no such agreement on limitation of use. To comprehend why an "open access" resource will tend to be abused and may be destroyed completely a game theory example, the prisoner's dilemma, affords a simple way of understanding.

IV.- THE PRISONER'S DILEMMA

The manner in which an open access to resources leads to overexploitation, possibly even on to the point of extinction, may be understood through a game-theoretical approach (Stevenson, 1991). In brief within game theory the actions of an individual or party are affected by what one assumes the other person or party will do or decide. As the classic example, the "tragedy of the commons", referred to grazing livestock on a tract of land, we employ that example here.

Table : The Prisoner's Dilemma Behavioral Matrix (Astern Stevenson, 1991)

		Owner B	
		Adds on an animal	Does not add an animal
Owner A	Adds an animal	-2, -2	+1, -3
	Does not add an animal	-3, +1	0, 0

The matrix presented as Table indicates what occurs when two livestock farmers, A and B, add cattle to the land.

In each case they have the option to add an animal or not. If neither of them chooses to add an animal the gains accruing to each of them are zero, for neither A nor B suffers or gains, as is depicted by the sequence 0,0 in the lower right of the matrix. This sequence 0,0 here relates to the sequence of gains (losses) for owners A and B respectively.

But say owner A adds an animal while owner B desists from so doing. This is shown in the upper right-hand corner of the matrix, where owner A achieves a net gain of +1 which arises from the initial gain A receives (say +4) which is partly offset by the effect of the extra crowding of A's own herd (-3). Owner B has not added any animal so suffers a net loss of -3. The bottom left corner of the matrix is the mirror image of the top right corner, where owner B achieves the net gain while owner A loses. Finally if both owners add cattle they both lose, as is shown in the top left corner of the matrix. The entries here reflect the fact that owner A gets +4 from adding an animal, but loses 3 due to the crowding effect, and loses another 3 from the crowding effect of owner B's animal. Thus owner A's overall gain is $+4-3-3=-2$. The same applies to owner B.

If, however, each owner does not co-operate, that is each operates in their own singular interests, the following results ensue. If owner B adds an animal owner A suffers -3 without adding an animal, but -2 by adding one. Thus owner A will add an animal to minimize a loss. If owner B does not add an animal owner A will still add an animal to get to +1 rather than 0 (without adding an animal). This means that whatever owner B does owner A's decision ("dominant strategy") is always to add an animal. Since the same analysis applies to owner B, in response to owner A's decision, a failure to co-operate will always produce the top left-hand corner of the matrix in which both suffer a loss of -2. However this means that their collective losses are -4, compared to collective losses of -2 if they were to operate in the top right-hand corner or bottom left-hand corner, or zero if they agreed that neither should add an animal. In essence this all shows that in time the failure to reach an agreement makes each party worse off. Thus the so-called prisoner's dilemma provides an insight as to why individuals, acting in their own self-interest and sharing an "open-access" resource, will tend to over-use it, where over-use means that, in the longer term, all concerned actually lose.

This is the scenario that increasingly appears likely within the Jordan Basin. In the recent past over_use of Jordan Basin waters by the Western-capitalized Israeli state has contributed to its economic advancement; yet in the longer term all Jordan Basin states face a crisis situation. Such a predicament will necessitate the various riparians coming together to acknowledge the limited nature of the resource and, ultimately, the setting of an agreement on rules for restricted use. That time is still well into the future; in the meantime Israel appears set on maintaining its power-political role throughout Israel, the Occupied Territories, the Golan Heights and she southern Lebanon. Thus the unreality of Hardin's metaphor in our present context may be summed up in the opinion "increase your own flock or herd size and kill off the neighbor's livestock", or in our present context, "use as much water as one can realistically take and let the devil take the hindmost".

A particularly apposite point relating to Israel's current high levels of water use is provided by Stauffer (1996) who proposes a dramatic reduction in Israeli agriculture and hence water usage:

... basically, two-thirds of (Israeli) agriculture enjoys such large (financial) subsidies, that, by reducing water use, thereby reducing subsidies, the net (GDP) benefit is positive (p. 14).

However when one considers the land theme with its associated agricultural mystique implicit within the Israeli - Zionist psyche (see Teveth, 1987, pp. 736-7; Shapira, 1992, p. 65; Rowley, 1992) such a reduction in water use for Israeli agriculture is highly improbable.

V.- THE RIVER BASIN CONCEPT, THE HELSINKI RULES AND BEYOND

This section quite briefly considers recent attempts to resolve certain of the problems relating to international river basin's pertinent to the situation within the Jordan Basin. Perception of the interdependence and interrelationship of the water resources within a river basin is considered by a number of international organizations as fundamental to proper water management regimes. The underlying concept of the unity of a river was taken up in the closing decades of the nineteenth century by planners of multi-purpose water developments, and was later extended to embrace entire river basins. In less than half a century jurists were able to arrive at a body of rules for the community of interests of states in a river basin. In 1911 the International Law Institute (ILI), in its Madrid Declaration, stated that 'Riparian states with a common stream are in a position of permanent physical dependence on each other.

The Institute set two essential rules deriving from such an interdependence which states should observe (see Macrory, 1985). Firstly, when a stream forms a frontier of two states : ... neither State may, on its own territory, utilize or allow the utilization of the water in such a way as to seriously interfere with its utilization by the other State or by individuals, corporations, etc. ... thereof (Quoted in Teclaff, 1991, p. 67).

The second ILI rule stipulated that the essential character of the stream, when it reaches a downstream territory, should not: have been seriously modified.

Some forty years later the International Law Association (ILA) put its stamp of approval on the notion of the integrated river basin as the proper unit for the co-operation of states in developing water resources. The Salzburg Declaration of 1961 then found that the rights of states to use waters flowing across their borders were defined by the principles of equity. However such principles were not specified, so doubts still persisted as to whether there were any specific legal rules applicable to the waters of international river basins.

However, there was no room for doubt in the ILA's Helsinki Rules, a crowning achievement of the ILA after many years of labor (Teclaff, 1991, p. 69).

Indeed, the Helsinki Rules of 1967 may be said to have been the first attempt by an international organization to prepare a complete and all-embracing international water courses.

The keystone of the Helsinki Rules was the concept of "the international drainage basin", which represented a significant step forward. McCaffrey (1991a) declared that:

For the first time it confirmed, in terms of judicial area, what naturalists, engineers and economists had previously accepted: that the basin as a physical whole and not only the river of the waters must be the object of legal regulation (McCaffrey, 1991A, p.143).

Several years later the International Law Commission (ILC) discovered that the use of the term 'drainage basin' was, not surprisingly, unpopular with upstream riparians. Such states generally favored the use of the term 'international river'; a definition which excludes not only tributaries but also groundwater.

In an endeavor to overcome this problem the ILC introduced the phrase 'international Intercourse system', which constitutes a 'shared natural resource'. Reservations were again expressed concerning the terms 'system' and 'shared' because they were seen as similar to the drainage basin concept, and instead an article was proposed providing that a state is 'entitled to a reasonable and equitable share of the uses of the waters' (McCaffrey, 1991A, p. 157).

However not everybody shared the view of Teclaff in his praise of the ILC. Chauhan (1981) had earlier suggested that, although rules have great utility, they cannot be claimed to provide a final and complete answer to all legal problems pertaining to uses of waters in international basins. Chauhan specifically pointed to the use of the phrase "equitable utilization", emphasizing that:

This can only be seen as help material rather than a concrete answer in determining the exact respective share of a contested basin state (Chauhan, 1981, p. 196).

Postel (1992) also considered the principles proposed by the ILC; for example the need to inform and consult with water sharing neighbors, to avoid causing substantial harm, and the proposal of equitable utilization. She concluded that each of these aspects is open to different interpretations:

The factors to be considered in determining reasonable and equitable use are so many and so broad as to offer little practical guidance (Postel, 1992, p. 120)

Finally Tarasofsky (1993) summarized the results of a conference on Water in the Middle East held in 1992. Here it was stated that the standards set by the ILC were 'too elastic', and that this, and the importance placed on the role of negotiations, favors the interests of stronger states. He was particularly outspoken in pronouncing that:

This result is due to political compromise by the ILC in the face of opposition by some upper riparian states (Tarasofsky, 1993, p.71).

In addition the 1992 conference concluded that it also felt that the ILC had left out important issues from its remit, such as issues related to large scale diversions, roles for international organizations in promoting cooperation and the problems of groundwater.

As McCaffrey (1991A) points out the twenty-seven articles adopted by the ILC between 1987-1990 did include the term 'system' but enclosed in brackets, to indicate that no final decision had been made. Also the expression 'shared natural resource' was not included and, in fact, the verb 'share' did not appear anywhere. McCaffrey is equally outspoken -when he remarks that:

Thus it would appear that the ILC, largely in response to the views expressed by governments, have backed away from the express recognition of the interdependence of the various components of hydrographic systems (McCaffrey, 1991A, p.16).

It is concluded here that although the ILA and ILC did appear to move one step further towards some legal agreement it was not enough and unless the states concerned begin to co-operate, and unless these organizations stop bowing to the governments of the politically stronger riparians, it is unlikely that any precise rules of law are ever going to be generally accepted. As the likelihood of co-operation between states who have an historical animosity towards each other is very unlikely perhaps the creation of general rules is not the best way forward in the settlement of such disputes (see Rowley, 1999).

VI.- THE RECENT UN CONVENTION (1997)

Particular attention here needs to be given to the recently published United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses (1997). It is stressed that the entire tenor of this document is permissive rather than mandatory, and open to so many interpretations and value judgements that render it quite meaningless both as a potential legal document or as a draft to act as a basis for further elaboration.

The title "The Law of the Non-Navigational Uses of International Watercourses" is therefore most inappropriate and indeed unacceptable. My Oxford Dictionary defines 'law' in part as:

Body of enacted or customary rules recognized by a community as binding ...

While my Webster's Dictionary refers to:

A rule prescribed by authority; a statute, a precept, ... legal procedures, litigation

This document cannot be said to accord to such definitions of law.

Let us briefly consider the looseness and arbitrary nature of this UN document. It is asserted that:

The convention applies to the uses, protection, preservation and management of international watercourses that are used for purposes other than navigation (UN 1997, p. 700).

However, There is a continued use of the terms 'watercourse' and 'international watercourse' rather than river basin. Such vacuity is apparent throughout, for example:

The present convention will serve as a guideline for further watercourse agreements and, once such agreements are concluded, it will not alter the rights and obligations provided therein. unless such agreements provide otherwise (UN 1997, p. 719).

Furthermore regarding Article 6(1) it is recorded:

In order to determine whether a particular use is equitable and reasonable the benefits as well as the negative consequences of a particular use shall be taken into account (UN 1997, p.719).

The use of such gobbledygook merely serves to reinforce the earlier criticisms by McCaffrey (1991), Postel (1992) and Tarasofsky (1993). No guidance is provided as to how such a difficult exercise ('to determine whether') may be set up, the various inputs quantified nor the base model calibrated. A focus on four articles out of the thirty-seven within this draft should suffice to demonstrate our deeper concerns.

These articles are reprinted here in part:

Watercourse agreements

Watercourse States may enter into one or more agreements..... (Article 3, part 3).

Management

Watercourse States shall, at the request of any of them, enter into consultations concerning the management of an international watercourse, which may include the establishment of a joint management mechanism (Article 24, part).

Indirect procedures

In cases where there are serious obstacles to direct contact between watercourse States, the States concerned shall fulfil their obligations of cooperation provided for in the present Convention, including exchange of data and information, notification, communication, consultations and negotiations, through any indirect procedures accepted by them (Article 30).

Data and information vital to national defense and security

Nothing in the present Convention obliges a watercourse State to provide data or information vital to its national defense or security (Article 31, part).

Thus, in brief, Article 3 suggests that watercourse States *may* enter into one or more agreements; alternatively they may not. Article 24 uses the more definite word "shall" relating to consultation, but again only the permissive "may" when referring to the establishment of a joint management mechanism. Likewise neither Article 31, nor any of the other Articles, either singularly or collectively, appear to refer to any set legal procedure for possible non-compliance with the aforementioned articles. Finally Article 31 provides the possibility for a legal loophole of momentous proportions whereby any non-compliance could be argued under the cachet as "vital to its national defense or security" (see also McCaffrey 1991B).

VII.- DISCUSSION

Our discussion here will focus upon three related issues. Firstly, we must reaffirm the fundamental need to consider the totality of the river basin as the basic component: in which management issues should proceed, and the failure of the UN 1997 pronouncement firmly to recognize that stipulation.

Secondly, there is a deepening requirement for a supra-state regional-level organization to evaluate, manage and coordinate environmental resources as water within the Jordan Basin. Thirdly, there is the quite simple yet- nevertheless crucial concern with the finite limitations of development and the possibility of "breaking" environments.

Firstly, relating to the need to recognize the totality of the river basin, there has been a long-standing call by a number of academics to consider the institutional aspect of 'entire river basin' management (O'Riordan and More, 1969). Newson (1992) is particularly concerned with 'the river basin concept' approach to water-resource issues, while Petersen et al. (1987) initially pointed out to river managers the centrality of the riparian zone. Indeed Petersen et al called for a "holistic, ecosystem approach" in which the prime goal is not catchment control but riparian control.

To that end Petersen and his colleagues set down certain principles of "repeated patterns of stream management", which include firstly that "watershed management is the goal, riparian control the starting point" and, finally, that "some stream management problems are the result of global environmental problems".

This final point, as Newson (1992, p.319) asserts particularly apposite. Likewise for our present concerns it is especially important as:

In North Africa and the Middle East... meeting the expected (water) demand by the year 2000 could require virtually all of their usable freshwater supplies, (while) contamination of water supplies is posing health risks and is drastically increasing the cost of water treatment- facilities. Polluted inland water bodies and seas are reducing the production of fisheries ... Polluted irrigation water poses health risks, undermines long-term crop productivity, and degrades she recreational use and aesthetic aspects of surface water (UN 1990, pp.89-90).

This is a telling indictment but recent: events suggest an even bleaker future.

While we have noted that "the international drainage basin" was a keystone concept of the Helsinki rules of 1967 we deplore the abject failure of the recent: UN pronouncement (UN, 1997) properly to address matters of entire river basin management. Such weak backsliding on this crucial matter is an indication of the problems that could lie ahead.

Secondly, relating to the notion of a supra-state regional-level organization, Johnston (1994) concludes that under the rubric of the prisoner's dilemma, "unselfish behavior" can only be guaranteed if it is enforced by an external authority, and that this serves: ... to provide a convincing case for the existence of the STATE to promote both the collective and the individual good (p. 474).

However, considerations by such as Falk (1971) have envisaged a rapid recognition that "the world system based on sovereign states cannot possibly deal effectively with the problems of the endangered planet" (Ehrlich, Ehrlich and Holdren, 1978, p.94). Later Ostrom (1990) and Pearce (1995) pointed to an increasing number of circumstances where environmental systems are global in their operation. Thus there is a real need for regulation of many environmental problems by an over-arching supra-state body (see Johnston, 1994).

This changing and enlarging environment of world politics serves to pinpoint the increasingly failing Westphalian (1684) model of a system of independent sovereign states (Cox, 1994). Set against such globalization tendencies it does appear possible c-hat geo-economics might well be set to supersede conventional geopolitics as an overarching concern of the 21st century (Stanley Foundation, 1993). Perhaps the need for such a supra-state regional body within and about the Jordan Basin and Sham, deriving from ecological-environmental concerns, rather than the more usual political-economy bases, could provide the catalyst from which deeper regional-integrative strategies might be contemplated.

Thirdly, concerning the idea of finite limitations to development, when I first became a professional geographer back in the mid-1960s a particular academic debate centered on the possibilist-determinist controversy (Montefiore and Williams, 1955; Taylor, 1993, 146-7). The creation and subsequent colossal growth and development of Israel into a modern industrial state, with a gross national product of some \$85.5 billion, a population of over 5.5 million, and an average income of about \$18,000 a year, in the dominantly semi-arid conditions about the eastern margins of the Mediterranean, is now having profound economic and environmental consequences upon r-he entire region and lends some support to the environmental-determinist's base argument of particular environmental constraints (Rowley, 1993 and 1999).

VIII.- CONCLUDING REMARKS

This contentious paper has served to highlight the deepening problems relating to Jordan Basin waters. Recent activities within the broader region conform with the standard model whereby national governmental approaches to environmental issues are generally rooted in self-interest, which usually favor short-termist sectional concerns within a national rather than a global context (Prins, 1990; Rowlands, 1995) However, Hurrell (1994) suggests that:

The increased seriousness of many environmental problems provides one of the most intuitive plausible reasons for believing that the nation state and the system of states may be either in crisis or heading towards a crisis (p. 146).

Hurrell proceeds on to suggest that the state and the fragmented system of sovereign states are increasingly unable to "guarantee the effective management of an interdependent world in general, and of the global environment in particular" (p.146).

The view advanced here is that supra-national regional groupings, as in a partial union of Jordan Basin states, Israel, Jordan, the Lebanon, Syria, and a reconstituted Palestine, would cooperate on an increasing range of sensitive issues including environmental matters. Indeed perhaps such deeper environmental concerns, as briefly and partially considered within this paper, rather than the traditional political-economic agendas, could provide the fundamental catalyst for moves towards regional integration in this area of the Middle East, which is now under increasingly dire threats from a serious over-exploitation and mismanagement of the natural environment.

The base problem, referring back to the Tragedy of the Commons metaphor, relates to the need for a broader or even an external agency to impose some system of sustainable use, which would serve to benefit the entire community, which for our present concern means the entire Jordan Basin.

It is most definitely believed that education and publicity has a fundamental role to play in the difficult tasks which lies ahead, and that this UNESCO Congress is but one further yet important step towards attending to the emerging agenda. Let us all publicize these matters as widely as possible and pray that deliberated and considered realistic compromises, based upon proper longer-term river basin management policies, may ensue.

ACKNOWLEDGEMENT

I thank Dr. David Knighton for his continued help on hydrological and related data.

NOTES

1. At present Israel's annual consumption of water exceeds the rational rate of replenishment. This necessitates the continuing control of the West Bank aquifer, which provides some 25 per cent of Israeli, which water consumption, and the southern section of the Litani Basin in south Lebanon (see Benvenisti et al 1986, 223-4; Rowley, 1993)

2. Past Israeli-Syrian clashes over water epitomize such a situation. In 1953 Israel was forced by the UN to abandon its plans to divert water from the Jordan River in the central demilitarized zone along the border with Syria to the Negev desert in the south. By 1959 Israel had begun the construction of the National Water Carrier to carry water from Lake Kinneret, the Sea of Galilee, to the Negev, with the project being completed in 1964. However the Syrians, who controlled the major source of this water, set up diversionary schemes to stop the water reaching Israel. Israel destroyed this Syrian diversion scheme in an overland assault between March-August 1965. The Syrian responded by developing a new scheme beyond the range of Israeli tanks. Israeli aircraft destroyed that scheme in July 1966. Following the occupation of the Golan by Israeli forces in June 1967 the problem was effectively "solved" with Israel being in firm control of these disputed water sources.

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