

# AN EQUITABLE APPROACH TO RESOLVING THE WATER CONFLICTS ON THE JORDAN RIVER BASIN UNDER CONDITION OF SCARCITY

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## ABSTRACT

*Five riparians share the water resources of the Jordan Basin- Syria, Lebanon, Jordan, the Palestine Authority and Israel. In general the rainfall distribution is such that the northern countries - Syria and Lebanon benefit from more plentiful rainfall which decreases drastically to south. These two most northern riparians have available to them about five times the potential water resources per capita/yr. as Jordan and Israel and some ten times that of the Palestinians who suffer from the most severe water shortages. The United States sponsored Johnston Plan of 1956 proposed a basis for an agreement for equitable allocations of the water resources of the Jordan Basin to all of the riparians. This proposal was accepted on the technical level by all the partners, but rejected by the Arab League for political reasons. No one knows if the recent severe draught conditions are indicative of general regional trends resulting from global warming or part of the normal cycles of draughts recorded over the past century. However, if the current trends continue the water shortages of all the riparian will increase and will exacerbate the tension between the five riparians over reallocation of the waters of the Jordan River Basin. The initial negotiating position of the Syrians and Lebanese concerning sharing water allocation from the Jordan Basin with Israel was that in their view, they as the upstream source of the Jordan waters had total use rights and no water should be allocated for Israel's use despite its legal position as a legitimate riparian created by a UN decision in 1948. The Palestinians hold similar claims concerning the shared waters of the Mountain Aquifer, whose main source areas arise in the Palestinian areas of the West Bank. However, international water law does not accept the claim that the upstream source countries have absolute and total use rights on water derived from their areas. International water law calls for equitable sharing among all the riparians in particular to meet human and social needs for domestic and urban water supplies. An accommodation on a just redistribution of the water resources is a sine qua non for reaching a peaceful resolution of the conflicts of region. The years of draught have led to new thinking about the nature of water allocations and agreements between the riparians. Fixed annual allocations are no longer considered realistic and a more flexible approach based on the actual fluctuations of the annual amount of rainfall should be worked into the agreements. Jordan and Israel have already reached a peace agreement between them basically resolving the water conflicts between them. Based on the assumption that serious peace negotiations between Syria, Lebanon, Israel and the Palestinians can become realistic possibilities in the not to distant future, it is proposed that the spirit of international water law serve as the basis for an accommodation. Since international water law calls for equitable sharing of the water resources among all the riparians on an international water basin it is only logical and socially just that the two northern upstream countries on the basin, Syria and Lebanon, who have considerably greater water resource potential than the severely water short Palestinians and Jordanians share some of their water to help meet the urgent human and social needs for domestic/urban waters of their less fortunate downstream Arab neighbors. This should be based on assuring the Minimum Water Requirement concept as proposed by Shuval in 1992 of an equitable allocation of 125 cu. m./person/year for each of the riparians. It is also proposed that Israel should also increase its water allocations to the Palestinian to help meet*

*some of their urgent human needs for domestic/urban water supplies from the shared mountain aquifer. In the authors view it is in Israel social and economic interest to help assure that the future Palestinian State, which will in time be established at its side, not only be able to survive but will thrive economically and socially in peace. Possible directions for regional solutions in the frame work of an overall peace agreement should among other things include: 1. Respect for the principle of International Water Law of "equitable and reasonable utilization" among the five riparians which implies that those countries on the international watershed with more plentiful water resources should share in proportion to their overall available resources with those suffering from water scarcity who are unable to meet minimal human needs. 2. First priority in water reallocations must go to meeting the urgent human and social needs for drinking water and water for domestic and urban use. Second priority should be for commercial, tourism and industrial use so as to assure a basis for livelihoods and economic welfare. 3. Agricultural and environmental/ecological needs for water should receive third priority with major efforts to increase the water efficiency of agriculture and develop alternative sources such as the reuse of purified wastewater. 4. Import of "virtual water" in the form of food staples should be the basis of assuring food security, particularly in the three truly water short countries- Jordan, Israel and the Palestine Authority. 5. In an era of peace regional projects to develop new water resources by reservoirs and diversions from such as the Yarmuk, Awali and Litani Rivers and possible imports from water rich Turkey. 6. Development of large-scale, low-cost regional desalination plants for brackish water and seawater to supplement water supplies for domestic/urban/ commercial/tourism and industrial use. Water conflicts need not be an obstacle to peace since regional cooperation on the development of the limited water resources of the area can become one of the attractive motivations for achieving peace.*

**Key Words:** *Jordan River Basin, equitable sharing among riparians, flexible allocations, first priority human-social needs-minimum domestic/urban water requirements; regional water projects and desalination-motivations for peace.*

## **1 INTRODUCTION.**

Five riparians share the water resources of the Jordan River Basin- Syria, Lebanon, Jordan, the Palestine Authority and Israel. In general the rainfall distribution is such that the northern countries - Syria and Lebanon benefit from more plentiful rainfall which decreases drastically to south. It has been estimated that these two most northern riparians in the year 2000 had available to them some 900-1000 cubic meter/capita/year (cm/c/yr) of natural water resources potential from all sources including the Jordan River Basin which is about five times the total potential water resources per capita/yr. available to Jordan and Israel of 200-250 cm/c/yr and some ten times that of that currently available to the Palestinians with some 90 cm/c/yr who suffer from the most severe water shortages( Shuval, 2000)

FIGURE 1

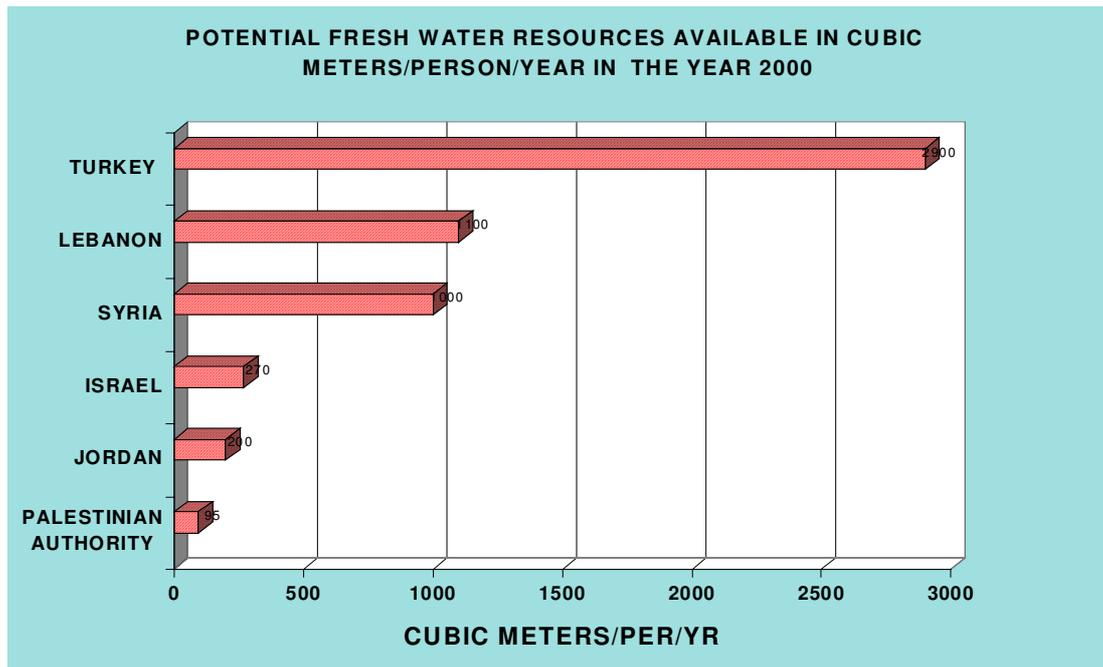


Figure 1. presents the estimated total water resources reserves potential from all sources of the five Jordan River Basin riparians on the basis of cubic meter/capita/year cm/c/yr. as compared to Turkey, the water rich contiguous neighbor to the countries on the Basin .

## 2 THE WATER CONFLICTS BETWEEN THE RIPARIANS.

As earlier as 1953 the water conflicts between Syria, Lebanon, Jordan and Israel over the utilization of the shared waters of the Jordan River Basin flared up (Shuval 2000). While at that time the upstream riparians, Syria and Lebanon, as well as Jordan and the Palestinians used only very limited amounts of the flow of the Jordan River waters. Israel initiated the construction of its National Water Carrier (NWC) to transport a portion of the river's flow which ran through its territory for the development of new irrigation and immigrant settlement projects in that country which had been established by the international legitimacy of a United Nations decision in 1948. That same UN decision established an Arab State in Palestine along side Israel, however this was rejected by the Arab nations who jointly attacked Israel and tried to prevent its creation.

After the foundation of Israel in 1948 it urgently needed additional water resources to enable the economic and social absorption some one million refugees from the Holocaust in Europe and the neighboring Arab countries from which they had been forced to leave. Israel water claims were based on their rights as a legitimate riparian for the equitable utilization of a fair share of this trans-boundary international water basin which flowed through their territory.

Syria and Lebanon held that since the main sources of the Jordan River was from rainfall and springs within their territories that only they, as the upstream territory had the rights for their use and that none would be allowed for Israel's use since they did not recognize its legitimacy. A minor localized military confrontation between Syria and Israel tanks and artillery took place in the fall of 1953 over Israel's initial attempt to construct a diversion canal for the National Water Carrier (NWC) from the demilitarized zone along the Jordan River at Gesher B'not Yaakov. This area, west of the international Syrian boundary as established in 1923 had been invaded by Syria during the war of 1948. Israel claimed that according to the armistice agreement it had to right to construct civilian irrigation works in

the area however, at the request of the United Nations and the United States, Israel ceased the construction of the diversion works in the demilitarized zone along the Jordan and latter built the NWC from a point on the shores of the Sea of Galilee which required heavy pumping but was entirely within Israel territory. Rather than go to war over water, Israel accepted an alternative plan which yielded the same amount of water but at much greater expense. In a way it can be said that this set a precedent by opting for a more expensive economic alternatives in order to achieve a peaceful accommodation. Out of this confrontation grew the American sponsored negotiations which led to the "Johnston Plan" for a practical division of the waters of the Jordan River Basin between the four riparians, which was accepted by Israel but was ultimately rejected by the Arab League since they claimed that agreeing to any water allocation for Israel, no matter how small, implied defacto recognition of Israel's right to exist ( Shuval ,2000).

On the practical level however, informal agreements to comply with the Johnston formula both by Israel and Jordan did provide the basis for the major American financial assistance to Israel in the construction of its NWC which enabled Israel to develop important irrigation projects in the south and Negev to provide employment and grow food for the massive immigration of refugees and to Jordan in the construction of the Eastern Ghor Canal (now known as the Abdullah Canal) providing for major new irrigation developments in Jordan. These agreements should be viewed as the initial, although informal, international agreements on the shared use of the water of the Jordan Basin.

On June 11th 1964 Israel's NWC was completed after five years of uninterrupted work. In January 1965, according the an Arab League plan Syrian and Lebanese initiated projects, approved and financed by the Arab League Summit Conferences at Alexandria in September 1964 to build canals to divert the head-waters of the Jordan River with the stated intention of preventing Israel from utilizing a major portion of its waters.

Israel protested to the United Nations Security Council declaring that these "diversions of vital water sources were an infringement of international law and its sovereign rights" The approach to the United Nation to intervene brought no results. In March, May and August 1965, Israel launched localized shelling from tanks and air attacks against the Syrian and Lebanese works, After the Israelis initial military interventions, in 1966 the diversion projects were eventually abandoned.

The second major area of water conflict developed between Israel and the Palestinians after War of 1967 which resulted from the Egyptian initiative to blockade Israel's southern seaport of Elath on the Gulf of Aquaba. Jordan joined the attack against Israel which in response occupied the Jordanian held territories of the West Bank which are the main areas of residence of the Palestinians. The natural flow of ground water into Israel from the mountainous areas of the West Bank has provided Israel with some one third of their best quality drinking water. These water sources had been developed over the years by Jewish farmers who settled in Palestine as earlier as the 1920's and had been almost fully developed within the borders of Israel prior to occupation of the West Bank by Israel in 1967. The Palestinian farmers and towns had sadly neglected these available shared water resources and developed only a minor portion of the water resources of the mountain aquifer prior to 1967, either under the British Mandate or Jordanian Administration when there where few if any constraints on their development. In reality, while some 80% of the waters of the mountain aquifer are derived from rainfall over the Palestinian areas of the West Bank some 80% of the water were and are historically used by Israel within the borders of the country prior to the occupation of the West Bank. However, the Palestinians claimed that all the waters derived from rainfall over the West Bank areas belonged to them and that they had the sole legal rights to their use. Israel, on the other hand claimed that as a legitimate down stream riparian it had the legal rights to continue to use the trans-boundary waters which flowed naturally into their territories and for which they claim prior /historic use rights (Shuval, 1996). Here once again, the question was: to whom do these shared water resources belong? Solely to the

upstream source areas or to those down stream riparians who have used the water legitimately, historically within their own territories( Shuval, 1992a and b)?

### **3 HOW MUCH WATER IS REQUIRED TO MEET MINIMAL REQUIREMENTS FOR ECONOMIC AND SOCIAL WELFARE IN THE ARID MIDDLE EAST?**

The question of the amount of water required by peoples living in arid zones has been widely discussed and debated. Falkenmark (1992) proposed the concept of a "water stress index" based on her estimated minimum level of water required per capita/year to maintain an adequate quality of life in a moderately developed country in an arid zone. Thus, according to Falkenmark, a level of 1700 cm/p/yr is required. She holds that when fresh water availability falls below 1,000 CM/P/Yr, countries experience "*chronic water stress*" and when countries fall below 500 CM/P/Yr they experience "*absolute water stress*." A number of authorities including the World Bank(1992) have accepted the 1000 cm/p/yr level as a *benchmark* which they claim can serve as a general indicator of water scarcity. Gleick(1994) has called it the "approximate minimum necessary for an adequate quality of life in a moderately developed country" All of these authors assume that a major allocation of water is necessary for agricultural purposes both to supply local food requirements ( food security) and/or assure employment for those who have traditionally lived in rural areas and made their livelihood from agriculture.

The 1,000 cubic meter/ person/ year *benchmark* level supported by some authorities assumes that major amounts of water must be used for agriculture and food production. This may be fundamentally correct in that *some place in the world the water must be available to grow enough food for all of the population in the world*. However it is a serious error to imply or suggest that each country can, should or must have at its disposal enough water to be self sufficient in agricultural food production. This can and has led to irrational and often dangerous perceptions and demands concerning national water needs. This is the fundamental fallacy of the *water stress index* or the World Bank 's *water benchmark*. Surprisingly the Kyoto World Water Forum of 2003, re-enforced this unrealistic water benchmark concept by adopting it as a world water resources goal to be aimed for.

There are a number of Middle Eastern countries who are already well below the 500 cm/p/yr level such as Bahrien, Kuwait, Jordan, Israel and Palestine and are at, or are approaching the 100-200 cm/p/yr level. As populations grow and after the domestic/urban and industrial demand is fully met, such countries will eventually have little or no water left over for agriculture. The question that must be asked is: Can countries facing such severe water shortages, whose main options for increasing water supplies are confrontations with neighbors over limited shared water resources or seawater desalination costing today about \$0.50-0.70/CM, consider agriculture as essential to their security or an economically rational way to use such expensive water? We feel that *food security* at any cost is an irrational societal and/or security option. Most experts agree that the growing of basic for crops with desalinated water or with water pumped from distant water sources over hundreds of kilometers away, can never be expected to be economically feasible. The experience today indicates the costs of such food staple can be as high as five times that of the same food staples purchased on on the world market. The import of food staples purchased on the world market which has been called by Allen- the import of *virtual water* is a much more rational and cost effective way for a water short country to meet its food security needs( Allen, 1994)

#### 4 THE "MINIMUM WATER REQUIREMENT" -MWR FOR URBAN USE IN ARID ZONES.

How much water is required for a reasonable standard of living to meet domestic/urban/industrial demand? A survey of 159 utilities serving the 100 largest metropolitan areas in the USA ( Environmental Engineering News, 1995) found that the 1994 average water usage was estimated as being equivalent to 310 liters/person/day or 114 cm<sup>3</sup>/p/yr for household use only. Total urban use including water for schools, hospitals, hotels, parks, commerce, and industry in the United States is about 180 m<sup>3</sup>/p/yr . In the areas of Europe which support a high standard of living, domestic/urban/industrial demands for water are lower than in the United States and range between 100-150 cm<sup>3</sup>/p/yr. According to the Ben Gurion University/Tahal report to the World Bank (Braverman,1994), Israel's domestic/urban water supply consumption averaged in 1993 some 100 cm<sup>3</sup>/p/yr. Industrial consumption averaged 23 cm<sup>3</sup>/p/yr. The report assumes that under proper conditions of highly effective programs of water conservation including the use of water saving devices in the home and water recycling in industry urban/industrial water consumption in Israel can be frozen at its present level over the next 30-40 years or even reduced by some 10%. They also assume that Palestinian domestic water use, which now averages some 35 cm<sup>3</sup>/p/yr will eventual rise to almost the same level as Israeli.

Experience in Israel indicates that a high standard of life can be maintained with a domestic/urban/industrial water consumption of about 100 cm<sup>3</sup>/p/yr (Braverman, 1994) This has been achieved by water metering, charging for the full combined cost of water supply and wastewater collection and disposal as part of the urban water bill, punitive increases in prices for overly high, domestic water consumption, as well as public education on water conservation. Water conservation measures such as the introduction of water saving fixtures in the home, and requiring all industries to recycle cooling water and process water, wherever technologically feasible has contributed to this conservation conscious water consumption level. It has been estimated in Israel that this figure might increase to about 125cm<sup>3</sup>/p/yr within a 30 year period.

In 1992 ( Shuval, 1992a and b) we first proposed the *Minimum Water Requirement* (MWR) concept as the basis for a criteria for the equitable sharing of the water resources among the riparians on the Jordan River Basin. The MWR proposed is a total of 100-125 cubic meters/person/ year- cm<sup>3</sup>/p/yr for domestic, urban, commercial, tourism and industrial use. The MWR calculation does not include any other direct allocation of fresh water for agriculture, but does assume that additional water for agriculture and/or other industrial or urban non-potable uses can be made available through the *recycling and reuse of some 65% of the water allocated for domestic/ urban/industrial use*. In other words there will be, in effect, the possibility of generating an additional 80 m<sup>3</sup>/p/yr if an effective, total water recycling program is introduced. Thus, the total effective allocation of water could reach some 200 cm<sup>3</sup>/p/yr (125 cm<sup>3</sup>/p/yr from fresh water sources and 80 cm<sup>3</sup>/p/yr from recycled wastewater).

We have concluded that when one talks in real world terms about *water security* in the strictly arid areas of the Middle East the rock bottom amount of water required per person per year for such realistic *water security* is the MWR of about 125cm<sup>3</sup>/p/yr. This concept has been widely accepted by many UN and world authorities including important groups of Palestinians. The perception and demands that greater amounts of water than that, including major allocations for agriculture and food production, are "*needed, "must be made available" or are "required for security and survival"*" are in most cases based on misguided concepts or are politically motivated and are more often than not unrealistic and misleading.

## 5 ESTIMATED MWR FOR THE YEAR 2020:

It can be roughly estimated based on World Bank and other sources ( Gleuk, 1992) that the populations of the five riparians on the Jordan River Basin will double over the next 20-25 years and their estimated MWR's for domestic/urban/commercial/ tourism/industrial use required for a reasonable level of social and economic welfare based on 125 cm/p/yr will be as shown in Table 2. From this rough estimate it can be seen that by the year 2020 Israel will have reached the red line in its available water resources and will just be able to meet its own MWR needs without any allocation of fresh water to agriculture. It will not have fresh water resources to spare. However, unless the Palestinians are allocated significant amounts of additional water resources the serious water shortages they currently face ( 86 cm/c/p/yr ), which is well below any acceptable minimum, will be severely exacerbated by the year 2020 with only some 40 cm/c/yr available to meet essential human social and economic needs.

Table 2.

Country	Population		Water Potential MCM/Yr.	Total Water cm/p/yr.		Total MWR 2020 MCM/Yr	Total Excess/ Shortage MCM/Yr
	2000	2020		2000	2020		
Israel	6	12	1500	250	125	1500	0
Jordan	5.5	11	1,100	200	100	1375	-275
Palestine	3.5	7	300	86	43	875	-575
Syria	12	24	10,500	875	438	3000	+7500
Lebanon	3	6	3,700	1230	616	750	+ 2950

However, both Syria and Lebanon, while not truly water rich countries will in the year 2020 still easily be able to meet their own MWR's and will have considerable amounts of water in excess above those needs. Their roughly estimated excess of water resources above the MWR levels will be 7500 CM/yr for Syria and 2950 CM/yr for Lebanon. While the estimated total shortages in vital water needs for human survival and social and economic welfare for Jordan and the Palestinians together will amount to some 850 MCM/yr. Even if the above rough estimated figures are off to some degree the general trends indicating which countries will suffer from severe water shortages and which countries will still have available to them significant water excesses is essentially correct.

## 6 THE PRINCIPLE OF EQUITABLE SHARING OF WATER RESOURCES AMONG THE RIPARIANS ON A SHARED INTERNATIONAL RIVER BASIN:

International water law does give weight to numerous geopolitical, geographical and hydrological issues such as the source the water, alternative water resources available to each riparian, historic and prior use as well as to human and social needs. However, it does not give priority in water use to an upstream country solely because the shared water resources are derived from rainfall, rivers, or springs in that country nor does it give absolute priority to the historic and prior use of downstream countries. Thus, the claims of Syria and Lebanon that all the waters of the Jordan River Basin derived from sources in their countries are fully theirs to utilize as they wish are not acceptable under international law. Syria is today fully aware of this principle since they correctly demand the right of continued historic use of the waters of the Euphrates River, which are derived from upstream sources in Turkey. Similarly international law does not recognize the claims of the Palestinians that all the waters that fall as rain over the West Bank areas which will be incorporated ultimately into the State of

Palestine but flow as ground water into Israel where they have been used historically for the past 80 years or so are today solely to be allocated for Palestinian use.

However, the basic overriding principle of *equitable sharing of water resources among the riparians* on an international water course is a deeply embedded principle of international water law. International water law as embodied in the 1997 United Nations Convention : “Law of the Non-Navigational Uses of International Water Courses” has promulgated two general major and equal guiding principles:

- A- To assure equitable utilization of the water resources among all the riparians on and international water course with priority given to meeting human and social needs for domestic and urban water above and beyond hydrological, geographic and geopolitical considerations.
- B- The obligation not to cause significant harm to other riparian states.

Thus in approaching the equitable allocation of the waters of the Jordan River basin in the spirit of international water law it is only right and socially correct to first evaluate the absolute minimum human needs to meet the requirement of social and economic welfare of all the riparians and to assure that each one receives a fair and equitable share at least to meet those urgent human needs. It then can be argued that those riparians faced with severe water needs should be assisted by those riparians with more plentiful water resource reserves. From the approximation of the Minimum Water Requirements for the year 2020 as presented in Table 2 it is clear that Jordan and particularly the Palestine will be faced with the most severe water shortages and will not be able to survive without assistance from their neighbors on the Jordan River Basin. The only two nations with an estimated excess of water reserves above and beyond those required to meet their own MWR's will be Syria and Lebanon, the upstream Arab neighbors of Jordan and Palestine. In the year 2020 Israel will itself be just able to meet its own MWR with little or no water reserves to spare.

If Syria and Lebanon join together in allocating an increased share of the Jordan River flow to Jordan and Palestine to the meet the amounts of water that those two will require annually in the year 2020 it will involved an annual allocation of some 850 MCM/yr or some 8 % of their total excess water resources above that required to meet their Syrian and Lebanon's own MWR needs. Is this an unreasonable demand to assure equitable water sharing and to meet urgent human and social needs of the water short riparians?

In addition to the above concept of equitable sharing among the riparians directly on the Jordan River Basin it is my personal view that Israel should, despite its own severe water shortages increase the water allocations to the Palestinians from the shared water resources of the Mountain Aquifer which drains from sources in the West Bank into Israel. It is in Israel's geopolitical, social and economic interest to help establish in Palestine an economically and socially viable state living in peace side by side with it. Increased water allocations by Israel to help meet some of their most urgent domestic and urban needs will help increase the stability of the newly created Palestinian State and assure that it not only can survive but can thrive economically and socially.

The ideas and concept presented in this paper may indeed be a truly unconventional approach to the concept of equitable sharing of the water resources on the Jordan River Basin but it is in my view entirely within the spirit and principles of international water law and in the spirit that those countries with more plentiful water resources come to the assistance of their less fortunate contiguous neighbors on the same international water basin. The basis for a just and lasting peace among the riparians of the Jordan River Basin must accept the legitimacy of each of the partners and their rights to an equitable share of the waters and base the

reallocation of the waters on objective analysis of real human and social needs of each and the ability of those with more plentiful resources potential to assist those in need.

The recent years of draught have led to new thinking about the nature of water allocations and agreements between the riparians. Fixed annual allocations are no longer considered realistic and a more flexible approach based on the actual fluctuations of the annual amount of rainfall should be worked into the agreements.

In light of the past experience with several years of serious droughts and the unpredictable long term effects of global warming on the water resources of the arid Middle East the sharing of water resources between the riparians should not be on a fixed quantity per year but be based on an agreed upon percentage of the available water flows in any given years. This will take into full consideration the anticipated annual fluctuations in the true availability of the natural water resources of the Jordan River Basin.

## **7 CONCLUSIONS:**

Possible directions for regional solutions in the frame work of an overall peace agreement should among other things include:

1. Respect for the principle of International Water Law of “equitable and reasonable utilization” among the five riparians which implies that those countries on the international watershed with more plentiful water resources should share in proportion to their overall available resources with those suffering from water scarcity who are unable to meet minimal human needs.
2. First priority in water reallocations must go to meeting the urgent human and social needs for drinking water and water for domestic and urban use- The *Minimum Water Requirement* (MWR) of 125 cm/p/yr.
3. Second priority should be for commercial, tourism and industrial use so as to assure a basis for livelihoods and economic welfare.
4. Agricultural and environmental/ ecological needs for water should receive third priority with major efforts to increase the water efficiency of agriculture and develop alternative sources such as the reuse of purified wastewater.
5. Import of “virtual water” in the form of food staples should be the basis of assuring food security, particularly in the three truly water short countries- Jordan, Israel and the Palestine Authority.
6. In an era of peace, regional projects to develop new water resources by reservoirs and diversions from such as the Yarmuk, Awali and Litani Rivers and possible imports from water rich Turkey.
7. Development of large-scale, low-cost regional desalination plants for brackish water and seawater to supplement water supplies for domestic/urban/ commercial/ tourism and industrial use.
8. Water conflicts need not be an obstacle to peace since regional cooperation on the development of the limited water resources of the area can become one of the attractive motivations for achieving peace.

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