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י"א סיון תש"ס

## "Definition of Israel's Water Problems"

or

## "Water as a Metaphor"

**Lecture Presented by Prof. Emeritus Dan Zaslavsky**

at Bar-Ilan University on the occasion of the inauguration of an Interdisciplinary Project  
entitled "Efficient Use of Limited Water Resources: Making Israel a Model State"

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## **1. The four major water problems Israel has to face are:**

- a) **Over-pumping** - the use of more water than is permitted by the natural annual recharge of rain;
- b) **Processes of water pollution** - caused by the following: over-pumping, sewage infiltration, leachates from waste piles, industrial spills and wastes, agricultural chemicals, fuel leakages, construction, transportation and urbanization.
- c) **Water and our neighbors** - current and future developments in the demand for water, and their management.
- d) **The manner and sophistication of management and decision making** – presently at an all-time low, with the appreciation of high professional expertise never so lacking as today.

The fourth group (d) is by far the most serious, as well as the most damaging. In fact, during the last two decades, the first three problems were amplified and worsened with almost complete professional deficiency. Examples and elaboration would sound unbelievable, especially in the view of the outstanding name Israel had had with respect to water problems. The very global prestigious esteem in which Israel was held during the first two decades since the establishment of the State is no longer justified.

The major problem today is how can we recover our ability to attend to these problems in an efficient and sensible way, with a view to saving both time and money.

## **2. Over-pumping**

There are very reliable hydrological data showing that the pumping of water had already exceeded the level of what is termed in hydrology the “safe yield” in the mid-sixties.

Then followed the salinization process in practically all the major aquifers as a result of a well-known and anticipated process. On lowering the water table sea water and old geological brines burst upward into the fresh water body. Over the years the demand for water has steadily increased. For example, in the past 12 years the increase in the demand was nearly 40 million cubic meters per year annually.

There are many, extremely serious results to this over-pumping. I shall mention them only briefly:

- a) Salinization by salt water intrusion, which eliminates at least 10 million cubic meters per year annually, thus reducing the availability of fresh water sources. As an example, nearly 20% of the coastal aquifer cannot be utilized due to salinity.
- b) The volume of the operational reservoir has been reduced. This year the Sea of Galilee has been emptied to an all-time low exceeding the red danger line. The major source of the mountain aquifer is in a similar situation and has also almost reached the red line. And finally, in the major coastal aquifer, the reservoir has been reduced by several billion cubic meters of water.

The effect of this non-reliability will cause increasing shortages, even for drinking water, every year or two. An estimate of the economical damage due to non-reliability in the supply of agricultural water was more than one billion shekels per year. This value of this damage could be sufficient to produce over 300 million cubic meters per year by means of desalination of sea water, and much more by desalination of brackish water and sewage recycling.

- c) The increased salinity in the water causes extreme damage to the soil, reducing crop yields and possibly even leading to an increase in blood pressure in children.

It has been estimated that the overall accumulated volume of the overall damage caused by over-pumping of one cubic meter in one year would add up to the current value of the production of 2-3 cubic meters of desalinated water, and which could in effect obviate the need to over-pump.

### **3. Water pollution**

As mentioned above, in addition to the intrusion of sea water there are additional sources of pollution. In municipal water uses some 100-120 milligrams of chlorine is added, with over 200 milligrams of total salts per liter. The re-use of sewage water and the infiltration of unused sewage have added over 200,000 tons of salts to the aquifers every year. Moreover, they have added nitrates, soluble organic materials, heavy metals and other chemicals, including carcinogenic ones. The exhaustion of the water resources and the recycling of sewage will leave no element of leaching or cleaning of the aquifers. In effect, this situation will lead to the gradual and complete destruction of water resources. This will undoubtedly follow if sewage treatment will continue as it is today, where solutes are not removed.

***If we were to adopt the high standards of water use which are common in Europe, 70-80% of the water of the coastal aquifer would be deemed non-usable !***

The organization responsible for the massive pollution and water source destruction in Israel is the Water Commission Office. For the last 25 years the idea of utilizing sewage water for irrigation has been promoted by the people employed in the above-mentioned office. They still consider this idea as a partial means by which to deal with the reduced water shortage. However, the results are the following:

- a) Creation of a path toward the definite destruction of water resources;
- b) Elimination of the water reserves used for farming that could be utilized as an operational reservoir for providing reliability of supply of domestic and industrial water;
- c) Destruction of soil by salinization and alkalization;
- d) Reduction of crop yields;
- e) Grossly limiting the crops that can be irrigated, leaving mostly those of lowest economical benefit.

This process continues despite the fact that proven alternatives to reuse water would not cost more than those methods in use today, and would also avoid all the above disastrous effects. Finally, it is worth stressing again the polluting effect of waste piles by the water seepage. The pollution by these leaches includes just about any chemical in the book. The responsibility for this frightening process is none other than the Ministry for the Protection of the Environment. Alternatively, the following could be imposed:

- a) Recycling of materials;
- b) Replacement of fuel of some 10% of electricity production by utilizing waste for energy. This would lead to an annual saving of over 200 million dollars on import;
- c) Handling of waste would also help solving one of the most serious environmental problems and an international commitment by the State of Israel: the reduction of greenhouse gas emission. This problem could become of an existential economical nature.

The main reason for existing technologies not being applied to eliminate these disastrous effects of waste disposal are incomprehensible.

- a) Electricity is heavily subsidized. Realistically, the rates should be 50% higher. The electricity from waste has a difficult time competing with other wastes, as do other clean energy sources.

- b) The municipalities are not charged at a realistic rate for the land, the use for disposing of garbage, and for the total environmental damages they cause. As an illustration, the land that Haifa uses for garbage disposal could be sold for a price of over 25 dollars/ton disposed waste. The municipality has never paid for this land and produced a mountain of garbage in the center of the town.

#### **4. Water and our neighbors**

Just a hint regarding the problematics of this subject.

- a) If the Syrian border will come closer to the 1967 border or the international 1923 border, and all of Golan Heights is handed over to them, chances are high that Israel would have to surrender its claim to approximately 1/3 of its fresh water.
- b) The Syrians plan to inhabit the Golan Heights by half a million people. This would undoubtedly turn the Sea of Galilee into a polluted, sewage-infested pool.
- c) A “bright” idea by some Israeli negotiators was to allocate some 100-150 million cubic meters of fresh water to the Syrians. They did not realize that this would turn the Sea of Galilee saline beyond all use.
- d) The mountain aquifer, which would serve the Palestinians in Judea and Samaria, is already heavily over-pumped today with no significant storage for reliability of supply. The increase in the population and the increase in standard of living would very soon leave much less water for use in Israel. The elimination of the mountain aquifer could eventually reach 20-25% of the fresh water use. Furthermore, by this overuse the Palestinians may lead to the complete destruction of the mountain aquifer by overpumping, especially during exceptionally dry periods when this cannot be resisted. This would also lead to sea water intrusion and total destruction of the aquifer. The ongoing recharge of the aquifer with sewage is an additional process which would reduce its quality to the point where the water becomes undrinkable.

I shall refrain from discussing the level and personalities of the teams that carried out the water negotiations and their attitude. They paid more attention to the competition between the Office of the Prime Minister and the Foreign Office than to the negotiation itself. More secrets were kept between the two offices than between the outside parties with whom they held their negotiations outside parties. Personal gestures, stances typical of oriental princes, resulted sometimes in less than professional considerations.

## **5. The management system**

- The authorities are scattered amongst 8 different ministries, with none of these holding the ultimate responsibility.
- There has not been a comprehensive water plan for Israel as a whole, neither for the short nor for the long term, at least not over the last 15 years.
- The last Water Commissioner worked with only one professional engineer. Yes, only one!
- The Water Commissioner scolded his senior staff and threatened them not to publish data of which he did not approve.
- Research and development diminished into a negligible economical volume of activity, about one part per thousand. The volume should in fact have been about 3%, or some 30 times more!.
- During the last 23 years water commissioners did not have a professional educational background of any kind.
- Under these circumstances it is only natural that only a minor number of students are drawn to study the fields of water sciences and engineering.
- The present Prime Minister insisted on nominating as the head of the team for water negotiation the present incumbent, who does not fulfil any of the criteria required to hold this position.
- The State Comptroller recently criticized the Prime Minister for not yet nominating a Water Commissioner when the Israeli water system is virtually in a situation of total collapse. As a result there has been nobody to whom to address these very serious problems.

The solutions which may be proposed to solve these difficult problems we are now facing in this dramatic crisis may be too negligible and too late. Truly, is there no other way?