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The Role of "Red Lines" in Safeguarding the Sea of Galilee (Lake Kinneret)

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Abstract

Over the last two decades, Israel has seen a trend of over-pumping and decline in water quality, a phenomenon which is especially evident in Lake Kinneret (the Sea of Galilee). During the 1980s, the multiyear average of water levels in the Kinneret was approximately -212 meters, whereas in recent years, the multiyear average has dropped to -214 meters. External problems result in Israel's water supply when the water level in the Kinneret drops below -213, such as difficulty in adapting the infrastructures to the water level, and changes in the ecological system and the state of the environment.

The main tool used to protect the level of the Kinneret from dropping has been the concept of "red lines," which mark the lowest water level administratively allowed to operate in the Kinneret. The red lines serve as a warning signal, and indicate a crisis situation that requires re-examination of the water pumping management system in Israel as a whole, and especially in the Kinneret basin. The red lines were first established in the late 1960s: the upper limit was fixed at -208.9 meters, and the lower at -212 meters. The Water Commissioner was responsible for enforcing these limits. The lower red line was originally placed at a relatively high level, but over the last six years it has been repeatedly lowered. As a result, the water level sank to an unprecedented new low in the summer of 2001.

The goals of this paper are:

1) To examine the effectiveness of the "lower red line" in maintaining a high water level in the lake.

2) To recommend possible institutional reforms in order to ensure high water levels in the Kinneret.

The research focuses on the decision-making process in allocating water to the various sectors, particularly to the Kinneret itself, and the structure of the system of checks and balances that regulates water allocation. This mechanism of checks and balances consists of the stakeholders who participate in the decision-making

process (as opposed to those that do not participate), and the institutional tools that are available to these "players" in promoting or preventing cutbacks in water quotas for agriculture, or in the amount of water allocated to the reservoirs, especially the Kinneret.

We found that the agricultural sector has many institutional tools for preventing cutbacks in the water supply for agriculture. These tools include: appeals to the Supreme Court, failure to publish the allocation key and failure to sign the records, enlisting the help of experts, and exerting pressure on the minister in charge of the Water Commissioner to object to the cutbacks. In addition, any reduction in the quota of water allocated for agriculture, or raise in the water prices, requires the consent of numerous bodies, including the Knesset Economics Committee, the Water Council, the Ministry of Agriculture, the Ministry of National Infrastructures, the Water Commissioner and the Ministry of Finance. In contrast, the professional echelon and the environmental and tourism sectors have few tools (especially informal tools) to prevent reductions in water quotas for the reservoirs, including the Kinneret.

The fact that representatives of the agricultural sector have numerous institutional tools at their disposal, whereas other sectors involved in the allocation process (namely the representatives of the environmental and tourism sectors) have a much more limited range of institutional tools — places severe constraints on the Water Commissioner when there is a need to decide on cutbacks. In other words, the system of checks is weak when it comes to changing the allocation of water to the reservoirs, and strong when it comes to the water prices and quotas for agriculture. Thus the aquifers, and the Kinneret, have been allowed to fall below the red line.

Changing this existing institutional structure, which was found to encourage the lowering of the red lines, requires system-wide reform in the water economy. This reform will establish a new system of checks and balances for the water sector, based on the following principles:

1. When the Kinneret reaches a level between the two red lines, the Water Commissioner will be given the autonomy to act as he sees fit. Restrictions will be placed on allocation and pricing of water, and the Commissioner will be able to act freely within the framework of these restrictions. Any decision

to disregard the red line or exceed the limits (on pricing and allocation) will require the approval of a supervisory body.

2. Any decision to exceed the permissible range of water prices or quotas for water allocations to the various sectors, or to circumvent the Kinneret red line, will be subject to the approval of the supervisory body.

3. This supervisory body, which is meant to prevent the inequitable distribution of authority and power, will include professionals from the water sector and academia, representatives of the consumers and from the various regions, and other stakeholders in the water economy. The body must not be biased towards any of the parties represented therein.

Introduction

Israel has a Mediterranean climate, which is characterized by fluctuations in the distribution and timing of rainfall (Amiran, 1994). In such conditions of hydrological uncertainty, reliable water supply depends on the existence of a large reservoir, and on a delivery system that brings the water from the various sources to the consumers.

Israel's water economy is based on three main reservoirs. The first of these is Lake Kinneret, which is Israel's only natural aboveground reservoir (see Figure 1). The average renewal rate of the Kinneret is approximately 560 million cubic meters (MCM) per year. The second reservoir consists of the aquifers: the Coastal Aquifer, the Mountain Aquifer, and local aquifers, which have an average renewal rate of about 400, 600 and 400 MCM/year, respectively, and which supply about 400 million MCM/year. The third source is recycled greywater and future desalination. Israel currently recycles some 300 MCM of water each year. To date (i.e., prior to the age of desalination) Israel's overall annual water potential is estimated at one billion cubic meters (Master Plan for Developing Israel's Water Economy, 2002).

The National Water Carrier, which was completed in 1964, combines the Mountain Aquifer, the Coastal Aquifer and the Kinneret into one integrative tri-basin system. This system conveys water from the available sources in the North, particularly from the Kinneret, to agricultural and urban consumers in the center of the country. This system also connects the various water sources, providing greater operational flexibility in times of crisis.

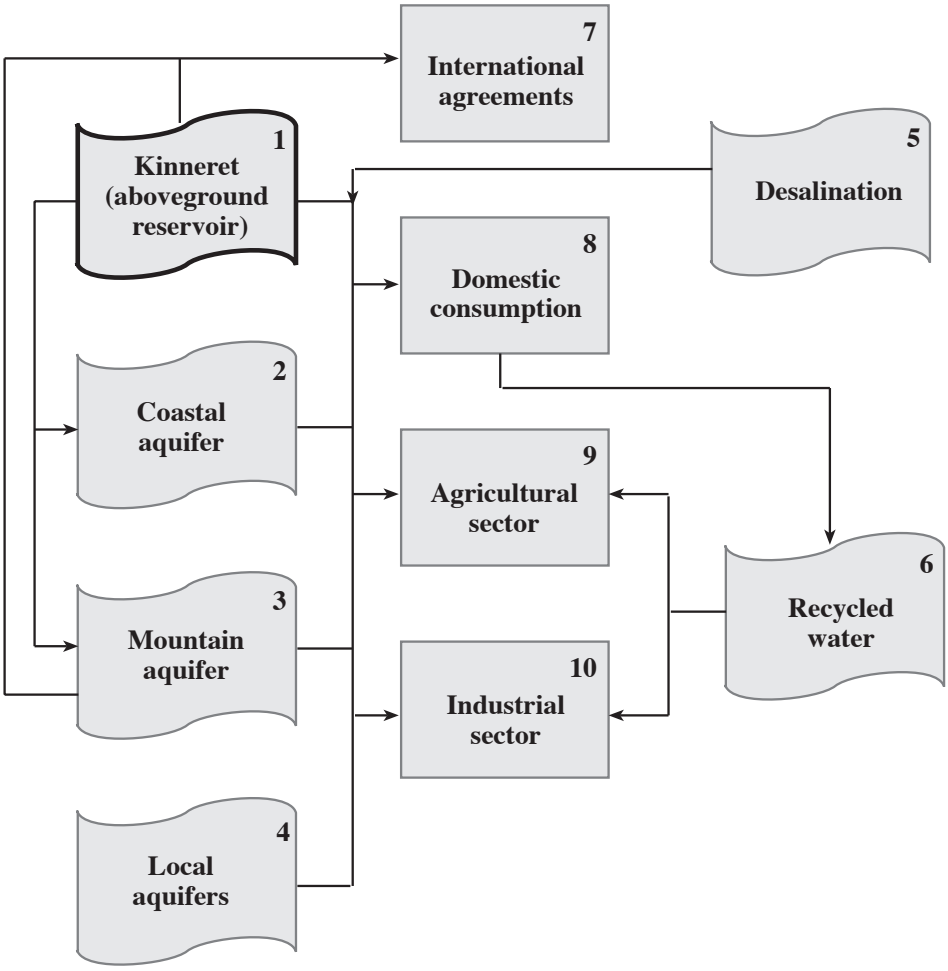
The combination of a delivery system and a large operational reservoir creates an integrative mechanism for the supply and management of water, which can handle the distance (between producers and consumers), seasonal disparity (between winter rainfall and summer consumption) and multi-annual fluctuation (between rainy years and dry years).

Water consumers fall into three major groups: domestic, agricultural and industrial (see Figure 1). In addition, Israel has certain commitments to the Palestinians and the Kingdom of Jordan. In 2003, the agricultural sector consumed about 53% of the overall water supply (Mekorot, 2004). This is compared with

1985, when 75.5% of Israel's freshwater supply alone was consumed by this sector (Israel Statistical Yearbook).

When Israel's water supply system was planned, several basic laws were passed, including the Water Measurement Law (1955), the Water Drilling (Control) Law (1955), the Drainage and Flood Protection Law (1966), and the Water Law (1959). The last law decrees that all water resources in Israel are owned by the State, and sets down the legal foundation for a centralized system that regulates the production

Figure 1: Water sources and consumers



and allocation of water sources. The law makes the Minister of Agriculture responsible for formulating the water production policy. However, in most of his areas of authority, the Minister is required to consult with the Water Council, including his authority to declare water rationing zones in times of crisis (Section 37 of the Water Law). In 1997, the Minister of Agriculture's responsibilities regarding water issues were transferred to the Minister of National Infrastructures, including supervision of the Water Commissioner.

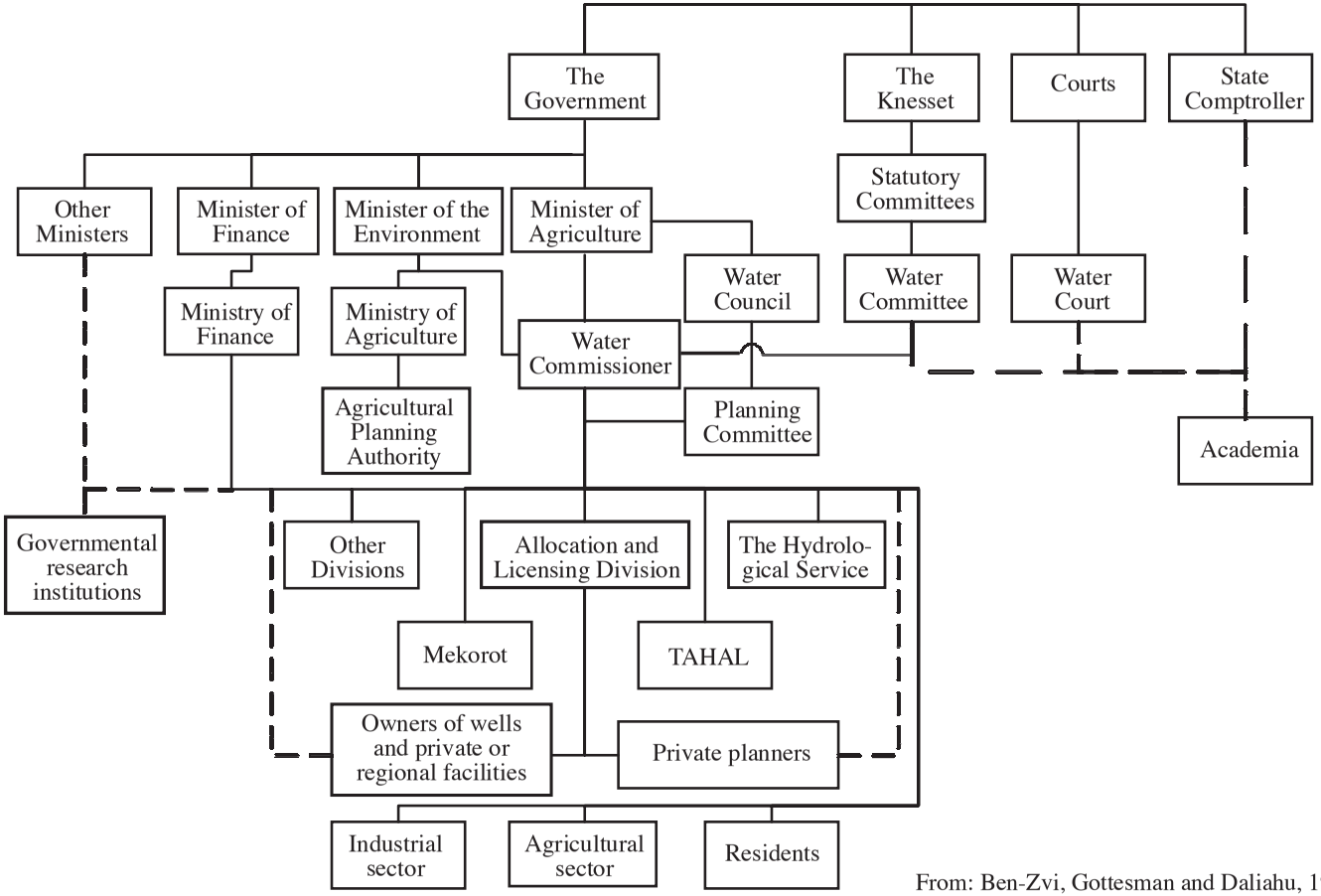
Responsibility for implementing the Water Law rests with a number of national institutions, the first and foremost of these being the Water Commissioner, whose role is to carry out the policy formulated by the Minister in charge. Other bodies are responsible for planning and operating the water sector. *TAHAL* (Israel Water Planning Company) is in charge of planning, Mekorot handles water supply, and the Hydrological Service is authorized to determine the availability of water (see Figure 2).

In the last two decades, the water supply to consumers has exceeded the renewal potential. Over-pumping of the reservoirs was especially evident in 1998-2000. During this period, the supply of fresh water for agriculture reached peak levels, reaching 918 MCM in 1998, in spite of several consecutive years of drought (Water Commission, 2004). Owing to this policy of over-pumping, the water deficit in the reservoirs was estimated in 2002 at two billion cubic meters (Report of the Parliamentary Committee of Inquiry on the Israeli Water Sector, 2002). Over-pumping caused salination of many of the coastal wells and deterioration of the water quality (Gevirzman 2002). Consequently, the Water Commission plans to expand the use of recycled water in agriculture, and thus reduce the consumption of fresh water. The scope of sewage recycling planned for 2010 is about 509 MCM (Water Commission, 2002). Desalination is meant to provide about 500 MCM in 2010 (Master Plan for Developing Israel's Water Sector, 2002).

In 2001, the supply of fresh water to the agricultural sector started to drop due to the water deficit and to a change in the allocation policy. By 2003, the amount of fresh water consumed by this sector dropped to 562 million cubic meters (compared to an allocation of 918 million cubic meters in 1998), and the rest of the water used by this sector was recycled (Water Commission, 2004).

Today, after two relatively rainy winters, the deficit in the water sector is estimated at about 1.6 MCM (Yarus, 2004).

Figure 2: Structure of Israel's water sector



From: Ben-Zvi, Gottesman and Daliahu, 1992

Conclusion

This paper examined the way in which the lower red line functions to maintain high water levels in the Kinneret, and has recommended possible institutional reforms that would help keep the Kinneret at a high level. The study focused on the decision-making process with regard to water allocations to the different sectors, and to the Kinneret in particular. Special attention was paid to the way in which the checks and balances are employed in planning Israel's water economy, that is, the different bodies involved, those that are represented (and not represented) in the water allocation process and their authority, and the effectiveness of the institutional tools used to promote and block allocation cutbacks.

The hypothesis underlying this research was that the lack of checks and balances and their ineffectiveness in the allocation of water to Israel's reservoirs, compared with the numerous checks and balances in the allocation of water to the agricultural sector, are the prime causes of the policy of lowering the red lines and over-pumping from reservoirs in general, and particularly from the Kinneret. During years of drought the Water Commissioner was unable to make drastic cuts in water allocations to agriculture, but cuts to the reservoirs were made easily and without public discussion, while constantly lowering the Kinneret red line.

The research consisted of several stages: The first stage identified and examined incidents when the red line was lowered, and the decision-making process in each case. The second stage analyzed several cases when the level of the red line was maintained, despite the drought. The third compared and contrasted the different cases examined, as well as the decision-making process concerning cutbacks in allocations to the Kinneret and to the agricultural sector. The final stage proposed a series of institutional solutions to ensure that the level of the red line in the Kinneret remains high.

It was found that a large number of bodies involved in the decision-making process have an interest in preventing cutbacks to the agricultural sector. These bodies have numerous tools they use effectively to prevent such cuts. These include appeals to the Supreme Court, failure to publish the allocation key and failure to sign the records, enlisting the help of experts, and exerting pressure on the minister in charge of the Water Commissioner to object to the policies set forth by the

Commissioner. On the other hand, the Water Commissioner has the option to institute emergency cutbacks and declare rationing zones. But the political price he would pay for employing such tools, and the association that has emerged during the years between the Water Commissioner and the agricultural sector means that such measures are rarely used. Furthermore, the agricultural sector can influence water allocations to reservoirs by influencing the recommendations made by the Water Council and the Water Level Committee. The fact that the tourism and environmental sectors are not part of the process of allocating water to the reservoirs means they do not possess the same ability the agricultural sector has to prevent cuts in agricultural allocations.

This arrangement of over-representation and numerous institutional tools in the hands of agricultural representatives versus the under-representation of other bodies in the allocations process, severely limits the Water Commissioner's freedom to decide where to make cuts. In other words, the system of checks is weak and uneven when it comes to allocating water to the reservoirs, and strong when it comes to the water prices and quotas for agriculture. This has led the Water Commissioner to lower the red line in the aquifers — including the Kinneret, and on the other hand, this is also the reason he has avoided cutting allocations to agriculture at a scope of over 50% (relative to the basic allocation of 922 MCM).

It would seem that changing the institutional structure that encourages the lowering of the red lines demands system-wide reform of Israel's water economy, which would help introduce a new system of checks and balances.

Conclusions and Recommendations

The recommendations based on this paper relate to the basic role and purpose of the red lines in the Kinneret, particularly the lowest red line, as part of Israel's water system in general. On the other hand, the conclusions recommend a mechanism to strengthen the red line as an effective checking measure in Israel's water economy, which reflects a variety of interests of all its consumers.

1. The main factor leading to disregarding the lower red line in recent years is the existing institutional structure of Israel's water economy. Cuts in water allocations for agriculture, or raising water usage rates, requires the agreement of a great many government ministries (Agriculture, National Infrastructures and Finance, and the Water Commissioner). Furthermore, the current institutional structure offers agriculture numerous tools to help them stop any expected cuts in water supplies, yet the decision to cut water quotas to reservoirs is the sole responsibility of the Water Commissioner. Such an institutional structure encourages the powers that be to avoid establishing and maintaining a higher red line, and the reform needed to introduce a system-oriented perspective into the decision-making process is lacking.
2. The numerous tools available to the farmers (to prevent cutbacks in water quotas to agriculture) compared with a small number of tools to prevent lowering the red lines, stresses the importance of the red line against lowering the level of the Kinneret.
3. The lower red line must serve as a barrier between the operating range (operating reservoir) of the water economy and the levels at which extensive external damage is caused in the tourism and environmental spheres. Reducing the level of the Kinneret below -213 meters causes external problems to the water economy, such as adapting infrastructures to the water levels, changes in ecological conditions and changes in the appearance of the landscape — with all this implies.
4. The ability to maintain the lower red line derives from the status of the water economy in general, and a system-oriented perspective. Therefore, the red line must be established in conjunction with the institutional structure of the entire water economy.

5. Lowering the red line over the past 15 years has been the result of a fragmentation of the decision-making process as far as water is concerned. In other words, a system of checks that is weak and uneven compared with a system that is strong and effective, especially the system responsible for water prices and quotas for agriculture, has led to our ignoring the red line as an effective checking mechanism.

6. The introduction of desalination systems opens new opportunities by enhancing the operational flexibility of the water economy and improves our ability to safeguard the red lines in the Kinneret and the aquifers.

7. We must support the red lines as an institutional system through institutional reform. The purpose of such reform is to create a system of checks and balances for the water economy by separating the Commissioner's autonomy in his ongoing management of the water economy, and the decisions that must be approved by a supervisory body representing different interests.

8. The Water Commissioner will be free to act as he sees fit, so long as the water level in the Kinneret remains within a defined range between the red lines. Similarly, ranges should be defined for pricing and allocations, regarding which the Water Commissioner will also be autonomous. Any decision to disregard the red line or exceed the restrictions (on pricing and allocation) will require the approval of a supervisory body.

9. In order to avoid concentrating too much power and influence with a single person, there must be a supervisory oversight body with authority to act. This body will include professionals from the water sector and academia (from numerous disciplines), regional representatives, and representatives of consumers and other stakeholders in the water economy. This body must not be biased towards any of the parties represented therein.

10. The supervisory body will be authorized to establish basic allocations and water prices for different consumers. The body will also set the lower red line. Any deviation from the red line will require, as stated previously, approval from the supervisory body. As part of his activities defined by the supervisory body, the Water Commissioner will have autonomy to manage Israel's water economy, in accordance with his professional orientation.

In conclusion, this paper states that it is essential to continue maintaining the red line; going below the current line (-213 meters) will cause extensive external damage. Therefore, the decision-making process to lower the red line must include those who would potentially be harmed as a result of such action, and give them additional institutional tools in order to alert us to the consequences of lowering water levels. The authority to approve such deviations must be given to a supervisory body that will represent the full range of interests and opinions. In other words, in order to promote effective use of the red lines as a control mechanism — the entire water economy must undergo institutional reform.