Chapter 4
Water in Agriculture

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The provision of water to agriculture, as well as to the other sectors of the economy, rests mainly on two principal foundations. The first is the 1959 Water Law, stipulating that all the water sources in the country are publicly owned and indicating that there are no private property rights over water or its use. The second foundation is the national system and the North-South Carrier around which the water system is built. Based on these constructs, Israel managed to provide water to agriculture, since its early days, not only in the rainy north, but also in the dry southern parts of the country.

Most of the water supply to agriculture in its early days was of freshwater (Table 4.1). The quantities grew gradually and peaked in 1985 (partly overdrafting); since then, the quantity the sector receives has decreased. Recent changes reflect both reduced precipitation—perhaps due to global warming—and expansion of the urban population: freshwater was diverted to urban consumption, with additional quantities of desalinated seawater, and treated sewage was returned to agriculture as recycled effluent. The legal regime of public ownership and the structural interconnectedness of the national system enabled a relatively smooth transformation of the water economy: the quantity of freshwater in agriculture in 2010 was less than 40% of the 1985 allotment. It would have been much more difficult and a lot more costly to achieve such a transformation under a completely decentralized infrastructure and a legal doctrine of private property rights in water.

The chapter draws on *The Water Economy of Israel* prepared for the Taub Center www.taubcenter.org.il. (Kislev 2012).

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Table 4.1 Water in agriculture, million cubic meters

	Freshwater	Recycled	Marginal	Total
1962	1,039		105	1,144
1985	1,235	43	155	1,433
2010	476	414	210	1,100

Source: Central Bureau of Statistics and the Water Authority
Note: Marginal is saline and floodwater

Examination of the agricultural water sector brings forward, not only successful allocation and reallocation, but also problem areas. This chapter will open with a review of developments and then turn to several policy issues.

4.1 Consumption and Production

Today, 40% of the water used in agriculture is supplied from its own facilities, mainly owned by regional and local cooperatives; the rest is provided by Mekorot. In the early days of the state, the supply to agriculture was limited to water from local sources—from the Sea of Galilee, wells, and rivers to irrigated fields close by. With the completion of the national carrier—one of the largest projects of the young state—the supply to agriculture quadrupled and expanded to all parts of the country. Yet, in the past 50 years, as can be seen in Table 4.1 and Fig. 4.1, the quantity supplied to this sector has not grown significantly.

The period beginning in the mid-1980s is characterized by a gradual shift from freshwater to recycled effluent and other marginal water, as well as by supply fluctuations. Despite the fact that the water quantity did not increase, the output of crops—vegetables, field crops, and orchards, agriculture's water consumers—steadily grew. In the past four decades, output of crops per unit of water has grown sevenfold, and once again, as can be seen in Fig. 4.1, this halting of the expansion of water supply has not slowed the expansion of agricultural production.

Many view the increase in agricultural production per unit of water as a measure of the success of Israel's irrigation technology. An OECD report (2010, Executive Summary) referred in this context to "an innovation culture spanning several decades." Israel's technology shows impressive achievements, but water is not the only factor responsible for the development of agricultural production. Among the other factors are the following: since the 1960s, the quantity of fertilizer used in agriculture has increased 50%; the quantities of fuel and oil used for machinery have doubled; and herbicide and pesticide use has tripled. Moreover, in the past decade, the area covered by greenhouses has doubled, and foreign labor has been added to the labor force, mostly excellent workers from Thailand. In contrast, the number of self-employed farmers has dropped, concentrating production into the hands of a relatively small number of professionals who can manage large farms.

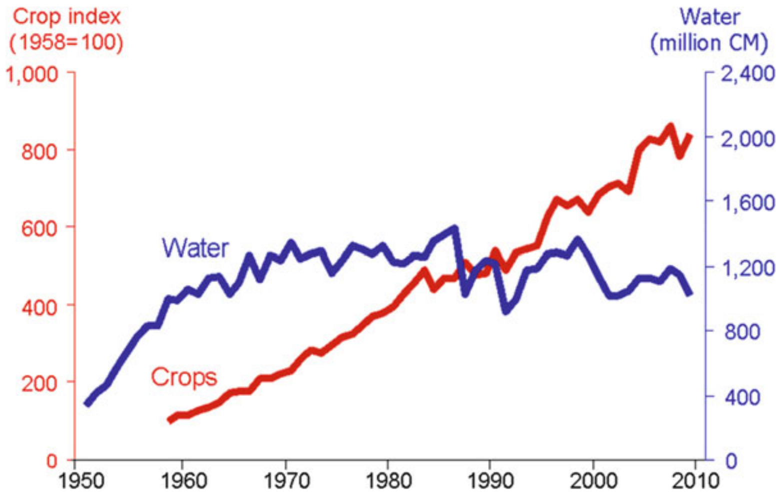

Fig. 4.1 Water and crops, 1950–2009 (*Source*: Central Bureau of Statistics)

These factors and others were combined with the technological achievements that have brought about a marked increase in agricultural production. Improvement in water technology has not been its only cause.

4.2 The Food-Water Balance

The quantity of water available in Israel does not suffice for production to cover the entire food needs of the country's population. A simple computation will demonstrate this, even if only with approximate figures. The computation is based on an approach developed by Tony Allan (2000) according to which food trade, or trade in other products, is actually trade in water used in the production process. While the products themselves are dry or contain only tiny quantities of water, their production requires water; consequently, export and import of food can be regarded as if they were trade in water. The term coined is virtual water.

In approximate terms, the quantity of water needed for producing 1 kg of grain seed (wheat, barley, and so forth) is 1 CM (precipitation or irrigation), and the quantity of food needed to feed one human is the equivalent of 1 ton of wheat per year or 1,000 CM of water. Therefore, in the first part of Table 4.2, the quantity of water needed to feed Israel's population (including foreign laborers and tourists) is written as 7,800 million CM of water per year. Add to that water for the urban sector and industry, and the total quantity of water needed is 8,600 million CM a year. Israel's available water, again in rough terms, is 1,500 million CM a year in the soil (from precipitation that wets the ground of fields and gardens) and 2,000

Table 4.2 Water balance and food import in approximate figures

Needs (water, million CM/year)		Resources (water, million CM/year)	
Food	7,800	In soil (from rain)	1,500
Home and urban	690	Extraction and recycled	2,000
Industry	110	Export	−500
		Total	3,000
		Import of virtual water	5,600
Total	8,600	Total	8,600

Main food imports	Thousands of tons	Virtual water, cubic meters per ton	Virtual water, millions of cubic meters
Grains	3,200	1.0	3,200
Oilseeds	394	1.3	512
Sugar	492	1.5	738
Beef	63	16.0	1,008
Total			5,458

Sources: Water – my estimates; food – 2009 Central Bureau of Statistics figures for foreign trade; virtual water – www.waterFootprint.org and my adjustments

million CM a year provided from natural and other sources. Subtract water for export crops—citrus, flowers, and others—estimated as 500 million CM a year, and one reaches the total available quantity of 3,000 million CM a year; hence, the yearly deficit is 5,600 million CM.

The second part of the table shows virtual water imports. For example, in Israel there is an import of 63,000 tons of beef a year. The quantity of water needed to raise 1 kg of beef is 16 CM, so that the imported beef contains a billion CM of virtual water. The aggregate quantity of the four main food groups in the table is 5,458 million CM of water a year.

Israel imports and exports many products containing virtual water. Although the balance in Table 4.2 is not complete, as even the food sector is not covered fully, it leads to a clear conclusion: we cannot be independent in our food supply, as Israel's water resources suffice to produce less than half of the quantity of food needed to feed its population; even large-scale desalination will not change this conclusion. The additional food that we consume is produced abroad, and we import it against exports of industrial products, services, and knowledge (virtual water can also be quantified in imported and exported industrial products).

Other countries in our region also need to import food, that is, virtual water. Tony Allan found that the Middle East is more dependent than any other region on virtual water imports. He remarked that this import added in the prevention of war: if we did not import food, the region's inhabitants would have fought desperately for every drop of water. Here is a contribution of globalization to peace.

4.3 Costs, Prices, and Levies

About 60% of water for agriculture is supplied by Mekorot. The prices that Mekorot charges are set in rules determined by the Water Authority. The prices charged by other suppliers—mostly regional associations—are not made public, but the Central Bureau of Statistics publishes aggregate data on the cost of water for all users, both Mekorot customers and others. These cost figures will be presented below.

The water law distinguishes between the cost of water and water fees. Cost refers to the cost of extraction and supply, on the "production" side (as distinct from the cost to users referred to at the end of the previous paragraph), and it was set in the past in regulations issued by the Minister of Agriculture. Today this is the responsibility of the Water Authority. Fees are prices paid by the users of water, which the law allows to be set based on various considerations, among them the users' ability to pay (the government has recently adopted a policy of cost-recovering prices). The law also sets extraction levies that are to reflect water scarcity and may differ from place to place.

In the past, water prices were determined with the approval of Knesset committees with no explicit connection to the cost of provision. When the Water Authority was established, it was tasked with price setting. Yet, just before its establishment in fall 2006, the government signed an agreement with farmers' representatives according to which water prices for agriculture would be set based on the average Mekorot cost of water supply to the sector, including agriculture's share of desalinated water. (The agreement also stipulated support for investment in agriculture, but this aspect will not be reviewed here.) According to the agreement, Mekorot's costs were to be agreed upon by a joint committee following a comprehensive study. The committee apparently completed its work, but its findings have not been published yet. Nevertheless, water prices for agriculture have risen and will continue to rise in the coming years.

Mekorot's tariffs for freshwater to agriculture are block rate prices. Each agricultural consumer, whether moshav, kibbutz, or individual farmer, has a basic water quota (also called 1989 quota and basically set administratively), and the prices paid are set according to demand relative to the quota in the following manner:[1]

Block I, Quantity A, 50% of quota	NIS 1.650 per CM
Block II, Quantity B, 30% of quota	NIS 1.902 per CM
Block III, Quantity C, 20% of quota	NIS 2.411 per CM

These prices do not include value-added tax.

The rules also set forth increments to the tariff for the coming years accordingly by 2016, the prices for all blocks will rise by 60 agorot per CM.

[1]The average exchange rate for 2011 was NIS 3.60 to US$1.

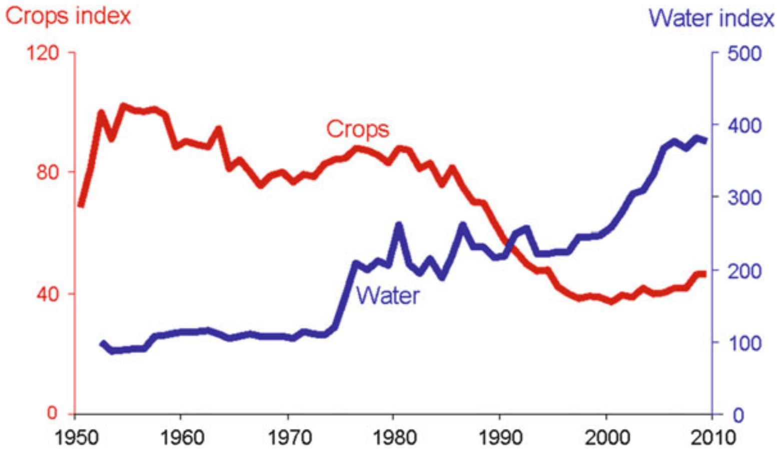

Fig. 4.2 Water cost index for agriculture and crop price index (*Source*: Central Bureau of Statistics)

In some special cases prices are different.
The charge for brackish water is lower, a decreasing function of salinity level.
An extra charge is set for consumption above the quota, termed irregular quantity.
The prices for recycled water supplied by Mekorot were set to be between NIS 0.80 and NIS 1.00, depending on quality.

By law, since 1999, water suppliers are required to pay extraction levies—aimed to reflect scarcity values—and they are allowed to pass them on to their customers. The levies differ depending on the water's end use, its locale, the season—winter or summer—and whether the year was rainy or dry. In fact, the levy does not apply to Mekorot and its customers. The levies will be presented in the discussion on policy below. All of the prices and the levies are linked to indices reflecting changes in the cost of water provision.

According to the letter of the law, water supply for agriculture is done by administrative allotment, in quotas: each consumer has a quota that was historically set by the planning authorities (1989 quota). The quota is supposed to be the maximum quantity that the consumer will receive. In fact, in recent years—until the recent crisis—the farmers have not used their full quotas, and the quotas served only to determine the price blocks (the quotas are reduced in periods of shortages and crises).

A few factors may affect agricultural water consumption. Figure 4.2 shows two of these: (1) the index of the cost of water and (2) the index of the price of crops (field crops, vegetables, and orchards). The indices are real, discounted by the consumer price index. The cost of water is the average cost per unit (cubic meter) of all types of water from all sources—not only payments to Mekorot—and it is the cost to the farmers. For those purchasing water, the cost is the buying price, and for those supplying water themselves, the cost is of self supply.

The average cost in Fig. 4.2 was stable for Israel's first two decades, then rose sharply in the 1970s together with energy prices (in the wake of rising energy prices, the cost of self-extraction rose, as did prices paid by farmers to Mekorot), and then rose again gradually from the 1990s until today. Over a 50-year period, the real cost of water quadrupled. In contrast, the trend in crop output prices has been a downward one, despite a temporary increase in the 1970s.

Today, product prices are approximately 40% of the real price that applied at the beginning of the 1950s. That is, in the period following the establishment of the state, prices were two-and-a-half times higher than what they are today. The reduction in price of Israeli agricultural products reflects a rise in productivity and a reduction in world market prices, both of Israeli exports and imports that compete with local products.

Water constitutes only a fraction—and frequently not a large one—of the total cost of producing agricultural products; therefore, a reduction in produce prices likely had a stronger effect on the demand for water than the rise in the cost of the water itself. Indeed, when agricultural product prices were relatively high, in the 1970s, farmers used their water quotas fully and even surpassed them, while later, when prices decreased, agriculture did not utilize all its allocations.

4.4 Policy

Examining agricultural water policy raises four issues: allocation to the sector and diversion of freshwater for urban uses, allocation among agricultural subsectors, tariffs, and levies in the country's regions, and cross-subsidization.

4.4.1 Allocation to Agriculture

In Israel's early years (the first decade after its establishment in 1948), particularly following the wave of immigration and mass settling of the land, agriculture was the main consumer of water, and the large water projects—the national carrier and the mains to the mountains, Negev and Arava—were laid to provide for the needs of agriculture. As the water sector developed, allocation to agriculture increased and peaked in the mid-1980s, as we saw in Table 4.1. Yet, over the years, Israel's population grew, urban water consumption increased, and freshwater was diverted from agriculture to the urban sector, partly replaced by recycle effluent.

The reduction of water allocation to agriculture came under criticism that was not always justified. The gradual diversion of freshwater from agriculture to urban consumption is one aspect of Israel's general and economic development, as well as that of world markets. For comparison, one can look at parallel changes that have taken place in the numbers of workers in agriculture. These changes were accepted uncritically: more than 120,000 people were employed in agriculture at the beginning of the 1960s; today fewer than 70,000 are employed in the sector, many of them are foreign workers. The number of Israelis employed today in agriculture is less than a third of what it was 40 years ago, although over that period, the population of the country tripled. The main cause of the reduction in the number of workers in agriculture—both self-employed and laborers—is the rise in income and salaries in other industries. Farmers and their children have shifted to occupations and income sources outside agriculture. At the same time, increased productivity—including improvements in water utilization—has enabled maintaining and even expanding the supply of fresh food to the growing population with a small and diminishing number of workers.

The gradual shift of freshwater from agriculture to other sectors is therefore part of the growth process and the change in the structure of Israel's economy. The freshwater goes over to the urban sector and is replaced, though only partially, by recycled water. It is likely that this shift would have been accepted uncritically if it had been accompanied by a sharper rise in the price of water than that which actually occurred. The farmers would then have voluntarily reduced the quantities of water that they took. Yet, the policy was one of price supports for agricultural water—because of appreciation of the difficulties of the sector, for the sake of maintaining a green environment, and due to agriculture's political power. Since the directing of water is in the hands of the state, and the decisions of government agencies have been to reduce supply to agriculture, the changes in water use have been perceived as coercive and arbitrary, thus generating sharp criticism on the parts of the farmers.

The gradual diminishment in the quantity of water supplied to agriculture was accompanied by another phenomenon, which generated even sharper criticism: that of repeated reductions in the water allocated to agriculture in dry periods (the fluctuations in the water graph in Fig. 4.1). Agriculture has borne the burden of the crises in the water sector, and according to its spokespeople, it has become "the fourth aquifer" to which the authorities came running every time there was a shortage. This phenomenon stemmed from the inability to reduce significantly and instantly water supply to urban consumption, from the fact that when all sources were tapped the water sector became tight, all development possibilities were practically exploited, and, above all, due to intense overdrafting that depleted the quantities of water in the reservoirs, leaving no reserves for hard times.

4.4.2 Allocations to Subsectors Within Agriculture

Households, institutions, offices, and others in the urban sector are not restricted in their water consumption; they are free to take as they please in exchange for paying the tariffs. As explained previously, a combined method prevails in agriculture: initial water allotment is administrative—each consumer has a basic quota—and the payment for the water is a function of quota utilization.

Water allotment, the quota, affects the farm economy in four main ways:

Initial allotment determines the structure of the farm and the farmer's ability to develop water-intensive crops or others.

Tariff setting: With block rate prices, a farmer who has a large quota can receive a greater quantity of water at the lower price of Quantity A.

Conversion to effluent: A farmer converting freshwater quota receives a quota of effluent of 1.2 CM for every CM of freshwater given up (for the high-quality Shafdan, the ratio is 1:1).

Mainly felt today, the quota is the basis for the reduced quantity of water to be used in times of emergency.

There are considerable differences in allocations to the agriculture subsectors. The most recent detailed numbers that I found are for 1998–1999. The quantity of water used then in agriculture was more than 25% larger of today's provision, yet there have been no significant changes in the proportional allocation to the subsectors since.

The data are presented in Table 4.3. Looking at the quotas (column 2), for 270 kibbutzim, the quota was 678 million cubic meters a year, whereas 411 moshavim were awarded only 519 million cubic meters a year. Neither the kibbutzim nor the moshavim used all of their quotas in 1999 (column 3). Only the non-Jewish sector used all its allocated water.

Looking at the allotment per land unit (column 4), the kibbutzim had more water than the moshavim; and the two sectors had a much larger quantity than did the non-Jewish sector. The land area of a farm community is practically a set size, whereas in contrast, labor input varies, and as such, it makes sense to associate it not with the quota, but rather to the actual water use (column 5). Here the differences between the sectors are large: six workdays per 1,000 CM in the kibbutzim; in the moshavim 23 workdays per 1,000 CM; and in the non-Jewish sector 50 workdays per 1,000 CM. Farmers who had at their disposal smaller quantities of water used them for labor-intensive crops, they "squeezed" the water more.

One explanation for the differential allocation to the subsectors is that it reflects a basic planning approach: kibbutz agriculture was built for large areas and mechanization. In the figures in Table 4.3, the average land area of a kibbutz in 1999 was 4,700 dunams, with water allotted commensurately. The average land area of a moshav was 2,600 dunams, and water allocation was accordingly smaller, on the assumption that the moshavim would engage in labor-intensive agriculture (the communal moshavim fell in between). Although this explanation is historically correct, these planned assignments led to differing allocations, with the kibbutzim still being able, if they so desired, to go over to labor-intensive crops, but the moshavim do not have the corresponding option of growing land- and water-intensive crops. A moshav farmer who wishes to expand has to collect means of production from others in the community or the region. The planning-based explanation for land and water distribution to Jewish communities does not apply to the non-Jewish sector; here the explanation appears to be clear-cut discrimination.

Table 4.3 Water in the agricultural subsectors, 1999

	No. of communities	1998 quota in millions of cubic meters	Use in millions of cubic meters	Quota in cubic meters per dunam	No. of workdays per 1,000 cubic meters used
	(1)	(2)	(3)	(4)	(5)
Kibbutzim	270	678	601	532	6
Communal moshavim	42	61	50	478	11
Moshavim	411	519	414	493	23
Non-Jewish	131	36	36	063	50
Urban/rural	55	216	140	763	16
Education/research	45	21	13	470	8
Sum/average	954	1,531	1,254	456	14

Source: Ministry of agriculture 2001

Notes:

(a) Urban/rural = noncooperative villages

(b) In column (4), dunam (one tenth of an hectare), physical area, field crops, vegetables, and orchards

(c) Workdays, in crop production

Recently, the Ministry of Agriculture has permitted quota trading. Although this option does relieve certain difficulties, the relief is only partial because trading is restricted, and—perhaps needless to say—only a farmer who was awarded a quota in the past can now transfer it in exchange for payment or for free.

4.4.3 Regional Tariffs and Levies

The data on water allocation point to differences between subsectors. The main differences in tariffs and levies are between regions. They reflect, however, not only regional conditions but also differences in organization and internal politics within agriculture. To focus, we consider only freshwater. As has been explained previously, in setting the tariffs that Mekorot's agricultural customers pay, the Council of the Water Authority follows the 2006 agreement. Farmers who are not Mekorot customers pay extraction levies set forth in the water law upon recommendation of the Water Authority Council. Thus, the farmers are divided (in paying for freshwater) into two groups: those who pay Mekorot tariffs and those who cover their own cost of supply and pay extraction levies. The tariffs of Mekorot are identical, uniform tariffs (though block rate prices) almost everywhere; the levies differ from place to place and season to season.

The schedule of levies in use today was first set as the second addendum to the water law in the fall of 2006, at the same time that the agreement with the farmers was formulated. Thus, the price agreement and the second amendment are, in fact, a single package. Regarding extraction levies, Israel is divided into three regions: disconnected (the Harod Valley, the Beit Sh'ean Valley, the lower Jordan Valley, the Dead Sea, and the Arava), the Sea of Galilee area (Mìgdal, Tiberias, the Jordan Valley, Yavniel Valley, the Golan, and the Upper Galilee), and the country system (all other places). The levies are defined in different values for extraction from aquifers and from surface water. Regarding the latter, a distinction is made between upper, mid-level, and downstream, as well as three hydrological conditions. (I did not manage to obtain from the Water Authority the geographical definition of the surface water regions.)

Table 4.4 shows the tariff and the levies for the country system in round numbers. The Mekorot tariff is repeated here for comparison. The extraction levies in the table are my calculations, using values from the tables in the second addendum to the water law, for mid-level surface water, for an average hydrological condition; extraction of downstream water is not levied. Table 4.5 shows selected extraction levy values for the disconnected and the Sea of Galilee region. Extraction to reservoirs in the Golan during the winter is exempt from levies; a levy does apply to pumping freshwater from these reservoirs, at a rate of 40% of that applying to surface water in the Sea of Galilee region.

As the values in the tables show, the highest price is the tariff for Mekorot freshwater, the next highest are the extraction levies in the country system; far behind are the extraction levies in the disconnected and Sea of Galilee regions. The differences are large by any measure.

Table 4.4 Mekorot tariff and extraction levies in the country system agorot per cubic meter

	Mekorot freshwater	Extraction levy: Aquifer	Extraction levy: Surface water
Quantity A	165	5	21
Quantity B	190	102	118
Quantity C	241	150	150
Average	188	63	76

Source: Water Authority website
Note: Mekorot's tariff applies to all regions, with the exception of a few unique cases

Table 4.5 Extraction levies in disconnected and Sea of Galilee regions agorot per cubic meter

	Disconnected	Sea of Galilee
Aquifer		
Quantity A	1	5
Quantity B	3	13
Quantity C	4	21
Average	2	11
Mid-level surface water		
Quantity A	0	4
Quantity B	1	11
Quantity C	2	17
Average	1	9

Source: The second addendum of the water law

Examination of the tables leads to several observations. The first is that there are two aspects to the regional extraction levy: (1) the allocation aspect and (2) the equality aspect. To begin with the former, the levies affect the national water system only in cases in which they are imposed in places that are connected—directly or indirectly—to the national water economy. This is the case in the Sea of Galilee region. Water taken in the Golan or the Upper Galilee does not reach the Sea of Galilee, thereby subtracting from the water balance of other parts of the country. With exceptionally low extraction levies, farmers in the Sea of Galilee region receive economic signals that differ markedly from those sent to others who also share water resources in the national system. The situation is different regarding water in the disconnected region. There allocation is internal and the decision on extraction is regional, without affecting the national system.

Considering intra-sector equality, it may be argued that all farmers should bear similarly structured levies, for example, in each region a levy reflecting local water scarcity. This view leads to another point that arises when examining the tables, which is agriculture's internal political organization. The lion's share of water supply in the north, the disconnected, and the Sea of Galilee regions is the responsibility of water associations that are regional cooperatives whose members are kibbutzim and moshavim. Naturally, these associations are also platforms for political activity, not in the partisan sense, but in the sense of negotiations with the public officials. The representatives of the associations bring the requests and needs of their member to the table. In contrast, Mekorot customers and farmers in the national system usually stand alone, each one and his connection to the national supplier or local provider; they have no collective voice. The organized farmers have more power than the others, and this may be the root of the great differences in users' water cost seen in Tables 4.4 and 4.5.

Another issue relates not to Tables 4.4 and 4.5, but to the underlying law. As already indicated, the Water Authority Council sets tariffs in rules, whereas extraction levies are considered a tax, and therefore, they are set forth in the water law itself (not in rules that are bylaws). Amendments to the law are made only after a decision by the Water Authority Council is presented for discussion and approval in the Knesset Finance Committee.

The levies themselves are not quoted in the law; in their stead, the law specifies a series of tables whose figures are multiplied by each other in order to get the actual values of the levies. In fact all the levies could have been printed out on a single sheet, but this was not done and the information was not presented in this simple way to the Water Authority Council or to the Knesset Finance Committee. It is hard not to reach the conclusion that the Water Authority has an interest in hiding the levies and the differences between them. Indeed, it has succeeded in doing so: the members of its council and of the Knesset Finance Committee approved a clearly inequitable tax without bothering to learn what it actually was.

4.4.4 Subsidies and Cross-Subsidization

The term subsidy applies generally to support by the public at large, by the state budget, to a sector or commodity. Cross-subsidization is support of one group of the public by another.

For a long time the state budget supported Mekorot and water prices for consumers, particularly for agriculture, that were lower than the cost of supply. Beginning in 2008, water prices have been set such that consumers' entire payment cover Mekorot's cost in full. Household and other consumers in the urban sector cross-subsidize water prices in agriculture. The Water Authority estimated this support to be at 90 agorot per CM of urban consumption (for 2011). As explained earlier, the price of freshwater in agriculture will rise, and cross-subsidization will decrease; some subsidy will however remain to cover the cost of the recycled Shafdan water and the effluents.

Another cross-subsidy will be applied within the farm sector: by the 2006 agreement, future freshwater prices of Mekorot will be set to cover the cost of provision to agriculture. This means that farmers in low-cost areas will cross-subsidize supply to high-cost regions; that is, some farmers, Mekorot's consumers, not all farmers and not the country's public at large, will carry the burden of supporting irrigation in the mountains and in the Southern Arava valley.

At this point, it should also be mentioned that the state budget supports various activities in the water economy, among them, sewage treatment and effluent recycling. This dimension of government support is not reviewed in the current chapter.

4.5 Looking Ahead

As seen earlier in the chapter, after growing for several decades, the supply of water to agriculture has been characterized, over the last 30 years, by a decreasing and fluctuating trend. Crop planning was uncertain and provision was sometimes curtailed in mid-season. Judging from recent developments of seawater desalination in Israel, barring climate catastrophes, agriculture can expect stable supply of water in the coming years. The provision of recycled effluent may even increase as population grows and treatment facilities expand.

Ample supply is costly and in the coming years farmers will have to pay increasing prices for water. Although agriculture is still regarded highly in Israel as the supplier of fresh food and the guardian of the environment, contributing barely 2% of net national product, it cannot expect to master in the future the political power that had enabled it to enjoy in the past heavily subsidized water tariffs.

The water economy of Israel is mature in the sense that most of its facilities—networks, desalination plants, sewage treatment, and recycling systems—are in place or being constructed these days. But maturity is not stagnation: urban population is growing, health and environmental regulations are tightened, and equipment and infrastructure have to be replaced and updated. The water sector will undergo substantial changes in the future, changes that may affect agriculture significantly. The central authority responsible for the governance and the regulation of the sector has been strengthened since the establishment of the Water Authority in 2007, and the share of the largest single utility, Mekorot, in service provision is growing as supply is augmented with desalinated water. These developments call for increasing public participation in the leadership of the sector: deliberations and decisions have to be transparent, information disseminated, and stakeholders in agriculture, town, and industry has to be routinely consulted. The water sector has still a long way to go in this direction.

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