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Table of Contents

Part 1 – The determinants of agriculture and the agro-industrial sector.....	4
A. Natural Resource endowments	4
Agricultural sector in the Israeli Economy.....	4
Land Use	5
Water.....	7
Water Pricing.....	11
Administrative steps reduction of quotas.....	12
Employment	14
B. Principal characteristics of agro-ecological zones	15
Climate Classification	15
C. Farm structure	20
D. Agro-industrial structure overview	22
E. Organization of the professionals in agriculture and agro industry	23
Ministry of Agriculture and Rural Development	23
The Agricultural Extension Service.....	27
F. Infrastructure – roads, electrification, communication and ports.....	27
Transportation	27
The Israeli railway system	28
The percentage of ownership of durable goods by Households in population...	32
Education	34
Summary	35
G. Marketing system	36
Production	36
Storage.....	36
Marketing.....	36
Wholesalers.....	37
Brokers.....	37
Food retailers and supermarket chains	37
Open markets.....	37
Specializing fruit and vegetable stores and green grocers	38
Part 2 - Evaluation of agriculture performance.....	39
A. Trends in overall patterns yields and production of major crops.....	39
B. Agriculture output value by purpose	42
C. Trends in major crops production	47
D. Trade by Destination	50
Import and export of agriculture fresh products	50
Part 3 - Marketing system of fruit and vegetables	56
A. Organizations	56
B. Marketing margins and mark ups	60
C. Revenue and profit (loss) for selected vegetables and fruits	62
D. Revenue and cost per Dunam.....	64
E. Consumption of fruits and vegetables.....	65
F. Calorie consumption balance 2003.....	65
G. Dependence in imports factor	66

H. International comparison	66
Part 4 - Evaluation of Agri Industrial performance	68
A. Import and export of fresh and processed food	68
B. Export and Import of Beef and Poultry including shell eggs.....	72
C. Export and Import of dairy products	72
D. Supply of fresh vegetables and fruit to factories, by use of the processed produce:	72
E. Analysis	73
F. Special Section -Focus on Tnuva the largest dairy producer.....	75
Part 5 - The Food retailing system in Israel.....	76
Part 6 - Agricultural and agro industrial policies.....	77
A. Brief history of major policy developments	77
B. Economic situation and its effects on the agricultural and food sectors.....	78
C. Governmental Support	78
D. International trade policies.....	78
E. Main aspects of protocol No.1	79
F. Main aspects of protocol No.2	80
References	82
Sources	82

Part 1 – The determinants of agriculture and the agro-industrial sector

A. Natural Resource endowments

Agricultural sector in the Israeli Economy

Israel's population has increase from 4.5 millions in 1990 to 6.3 millions in 2002 (40% in 12 years or 2.84% annually). In contrast, the agricultural sector steadily declines -- from 186,000 workers in 1990 (4.12% of the population) to 157,000 in 2002 (2.5% of the population). The share of agriculture in Israel's GDP has stabilized at about 1.65% after consecutive five decades of decline. In 1950 the share of agricultural output was above 50% of total GDP – most of it originated from citrus export to Europe. These trends are common in developed nations and were exacerbated in Israel due to water scarcity. In addition, a political change in the late 70s was unfavorable for agriculture and led to cessation of subsidies to the agricultural sector as part of the change in national priorities – way beyond international trade requirements, such as those of the GAAT or WTO.

Myopic management of water resource increased overall water deficit led to an increase in water prices and a decrease in agricultural water allowances. This together with the reduction in agricultural subsidies reduced the number of active farmers and the weight of the agricultural sector in the national economy. On the other hand, it forced the remaining growers to become more efficient. We will discuss these changes and their effect on the agricultural sector in details in part 5. Table (1) presents the share of the agricultural sector in inputs and outputs:

Table 1 - Agriculture share in Israel's Economy (% of total)

	1995	1997	1998	1999	2002	2003
Gross Domestic Product	2.1	1.8	2.0	1.6	1.7	1.6
Employment	3.6	3.3	3.3	3.3	2.5%	
Investments	2.3	1.3	1.5	1.5		
Land Use	19.0	19.0	19.1	18.3		
Water Use	64.1	64.5	62.8	59.6		
Export total					4.1	4.4
Exports Fresh	3.8	3.8	3.9	3.4		

*Fresh

Sources: Statistical Abstract of Israel 2000 No 53, Statistical Abstract of Israel 2004 No 55. From the Ministry of Agriculture and Rural Development website, "ISRAEL AGRICULTURE, facts and figures" by Dr. Arie Sheskin and Dr. Arie Regev, www.moag.gov.il

Table 1 indicates that although the share of production and employment decreases over time, the share of export increases. The share of investment decreases less than the share of production and this supports the long-term efforts to change the cropping patterns toward higher-value and water-saving crops. Table (2) provides information on natural resources endowment in the years 1990, 1995 and 2002.

Table 2 - natural resources endowment in the years 1990, 1995 and 2002

Item	Unit	1990	1995	2002
Total Area	1000Ha	2,214	2,214	2,214
Land Area	1000Ha	2,171	2,171	2,171
Agricultural Area	1000Ha	579	573	566
Arable & Permanent Crops	1000Ha	431	428	424
Arable Land	1000Ha	343	345	338
Irrigated land	1000Ha	181	192	182
Total Population	1000	4,514	5,349	6,304
Population annual growth	%	2.61%	3.24%	2.11%
Rural Population	1000	439	490	515
Agricultural Population	1000	186	178	157
Agri Pop annual growth	%	-2.11%	-1.11%	-1.88%
Total population / Arable land		13.16	15.50	18.65
Total Agri Population / Agricultural Area		0.32	0.31	0.28
cultivated land per capita (Ha)		0.10	0.08	0.07

Source: FAO (Food and Agriculture Organization of the United Nations) Statistical Databases website, <http://faostat.fao.org>

Total agricultural area in Israel has been fairly stable over the years around 566,000 hectares, which is about 26% of total land area – far beyond the share of production and employment. The high share of land use in a crowded country indicates the importance of agriculture beyond its commercial value. About 182,000 hectares are irrigated and this share has also been stable over time.

Water has been always a scarce resource in Israel and since 1999 it became critical. The water crisis is so acute that it threatens the existence of parts of the agricultural sector in Israel. The ministry of treasury is leading a course aimed at changing the pricing and allocation of water. In essences this course has a goal of charging growers with the marginal cost of water production, including scarcity cost. Currently the agricultural sector pays on average less than a half of the production and conveyance cost. The water crisis in Israel is discussed in details in section (A3).

Land Use

Israel has six natural regions: Upper Galilee, Western Galilee, Northern valleys, Central region, central plain and mountain, and the Negev Desert. The Negev Desert, located in the southern part of Israel captures more than 50% of Israel's area (see attached map).

Table 3: Land Use in Israel 1990-2002 at 1000 Ha

	1990	1995	1996	1997	1998	1999	2000	2001	2002
Total Area	2214	2214	2214	2214	2214	2214	2214	2214	2214
Land Area	2171	2171	2171	2171	2171	2171	2171	2171	2171
Agricultural Area	579	573	564	563	562	559	566	566	566
Arable & Permanent Crops	431	428	419	419	419	418	424	424	424
Arable Land	343	345	336	336	335	333	338	338	338
Permanent Crops	88	83	83	83	84	85	86	86	86
Permanent Pasture	148	145	145	144	143	141	142	142	142
Forests And Woodland	119	0	0	0	0	0	0	0	0
All Other Land	1473	0	0	0	0	0	0	0	0
Non Arable & Non Permanent	1740	1743	1752	1752	1752	1753	1747	1747	1747

Source: Rural Planning Authority, Min. of Agriculture and Rural Development, 2003

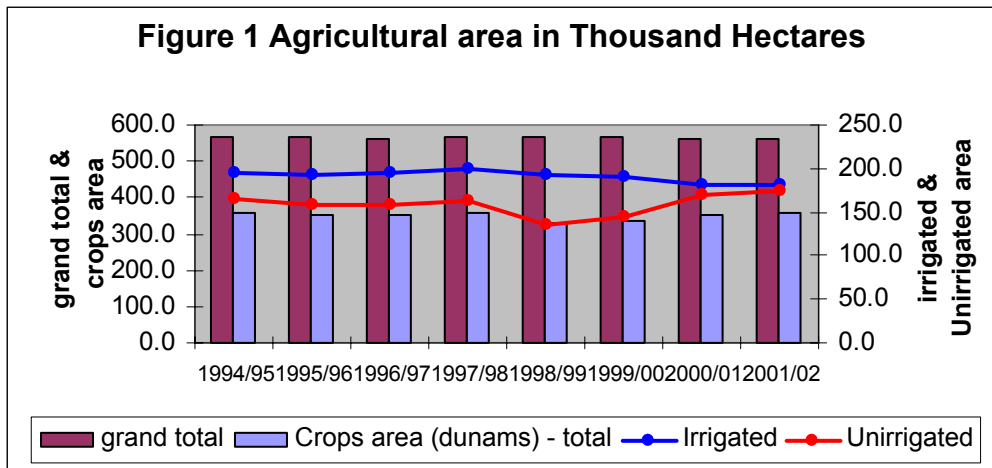
The size and the proportion of agricultural area from the total land area did not change much over the last decade. The constant proportion of land which is designed for exclusive usage for agricultural purposes is part of regulation aimed to preserve agricultural land and avoid urbanization. The slight decline in the size of arable land results from special cases of kibbutzim that over the time became surrounded by large cities increasing the alternative cost of agricultural land beyond sustainable level.

Table 4 - Irrigated and unirrigated land; Land by Agricultural Use: 1994/5- 2001/2002 (in 1000 ha)

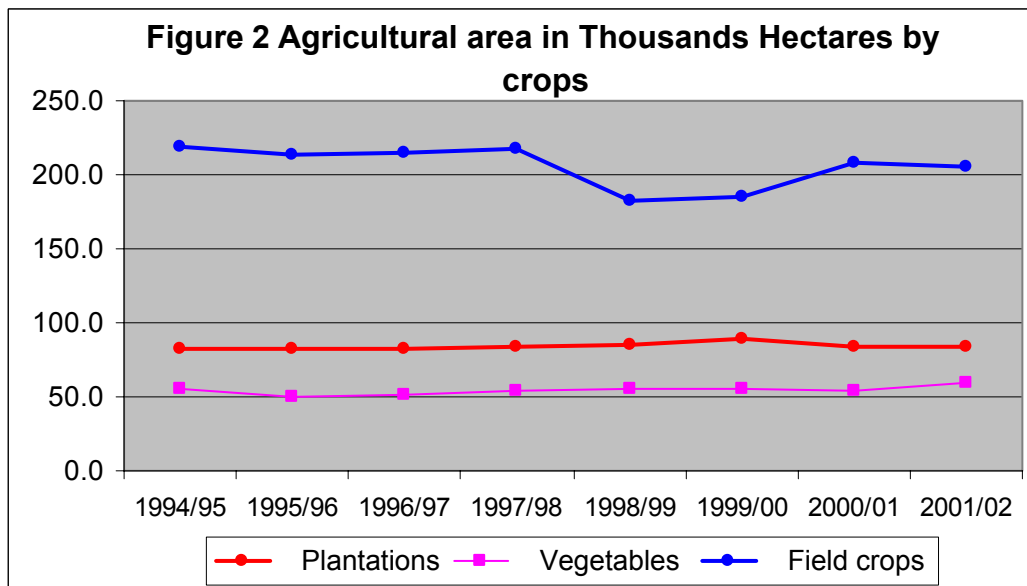
	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
Grand total	567.1	565.9	561.7	565.3	567.3	569.1	561.4	562.6
Crops area - total	360.5	351.0	353.7	360.4	328.1	334.4	352.0	355.1
Irrigated	194.3	192.4	194.3	198.6	192.1	190.3	182.2	181.6
Unirrigated	166.3	158.6	159.4	161.8	135.9	144.2	169.8	173.5
Thereof:								
Plantations	82.3	83.0	82.7	83.7	84.8	88.9	84.3	84.2
Vegetables	55.8	49.7	51.5	53.8	55.5	55.1	54.4	59.9
Field crops	218.4	213.9	214.8	218.0	182.5	185.0	208.0	205.8

Source: Agriculture in Israel (the Industry Account, Area and livestock, Price Index of Output and Input) 2001-2003, central bureau of statistics of Israel September 2004, Table 1.

The size of the land used for agricultural production declined by 5000 hectares during the last 7 years (an annual decline of 1.4%). The main changes are the proportion of unirrigated land that increases due to water shortage and the increase in the area used for production of high value crops such as vegetables and the parallel decrease in the low value field crops.



Source: Agriculture in Israel (the Industry Account, Area and livestock, Price Index of Output and Input) 2001-2003, central bureau of statistics of Israel September 2004, Table 1.



Source: Agriculture in Israel (the Industry Account, Area and livestock, Price Index of Output and Input) 2001-2003, central bureau of statistics of Israel September 2004, Table 1.

Water

Water scarcity is a main limiting factor of the Israeli agriculture. Three main water resources supply most of the water demand for agriculture, domestic and industrial use. The Sea of Galilee, from which an average annual quantity of 400 million cubic meters is pumped to the Negev, the coastal aquifer and the mountain aquifer.. Annual average prescription is 610 mm (154 years average) with very high spatial and temporal variability. Arid years receive around 300 mm of rain. The rainy season lasts from October to April. The annual quantity of rain is measured in three geographical areas: the coastal region, central and mountain region, and the Jordan valley. The annual average rain is in the range of 800 mm, in the north, to 25 mm in the Negev. Haifa (north cost line) enjoys 536.3 millimeters (mm), Jerusalem (interior Israel) has an average of 554 mm. More than half of the area of Israel is in Negev getting less than 200 mm annual rainfall.

The sharp increase in the population of Israel due to in-migration¹ and high fertility rate increased the demand for water while water supply stayed constant. In 1998 total water demand exceeded sustainable supply (based on average natural recharge) by 212 million m³ and in 1999 by 317 million m³. Table (5) depicts water consumption by use in all sectors. The total consumption increased monotonically from 1950 until 1999 reaching the peak level of 2164 million cubic meters. The agricultural sector has an important role in the growing demand. In contrast to the agricultural demand, domestic per capita consumption has increased modestly, and the industrial consumption remained constant.

Table 5 - Water usages 1986-2003 and forecast for the year 2005²

Year	Agricultural usage	Household ³	Industry	Total
1986	1125	423	104	527
1987	1188	445	109	1742
1998	1250	500	110	1860
1989	1179	501	114	1851
1990	1236	482	106	1804
1991	1216	445	100	1420
1992	916	490	106	1551
1993	996	536	106	1679
1994	1175	548	128	1840
1995	1190	568	134	1928
1996	1275	568	138	2042
1997	1285	621	123	2008
1998	1365	672	129	2166
1999	1264	682	127	2073
2000	1137	662	124	1924
2001	1022	658	120	1800
2002	1021	688	122	1831
2003	1045	698	117	1860
2005	1178	731	170	2413

Sources: <http://courses.agri.huji.ac.il/71721/kislev-atlas2.pdf>, Heiman, (2002).

In 2000, in an effort to balance demand and supply of water, the water commissionaire reduced the agricultural water quota to 1137 million cubic meters (from its 1365 m³ peak in 1998) and in 2001 an additional cut of 75 million m³ was imposed on growers.

Table 6 and Figure 3 presents the consumption per capita and consumption per capita by usage sector. Since 1999 the consumption per capita of water by the agricultural sector decreases as a result of population grows and reduction in fresh water quotes.

¹ More the 1 million Russian immigrants Jews during the 80's (20% increase in the population in three years) and steady immigration rate of 60000 (1%) per year in the following years.

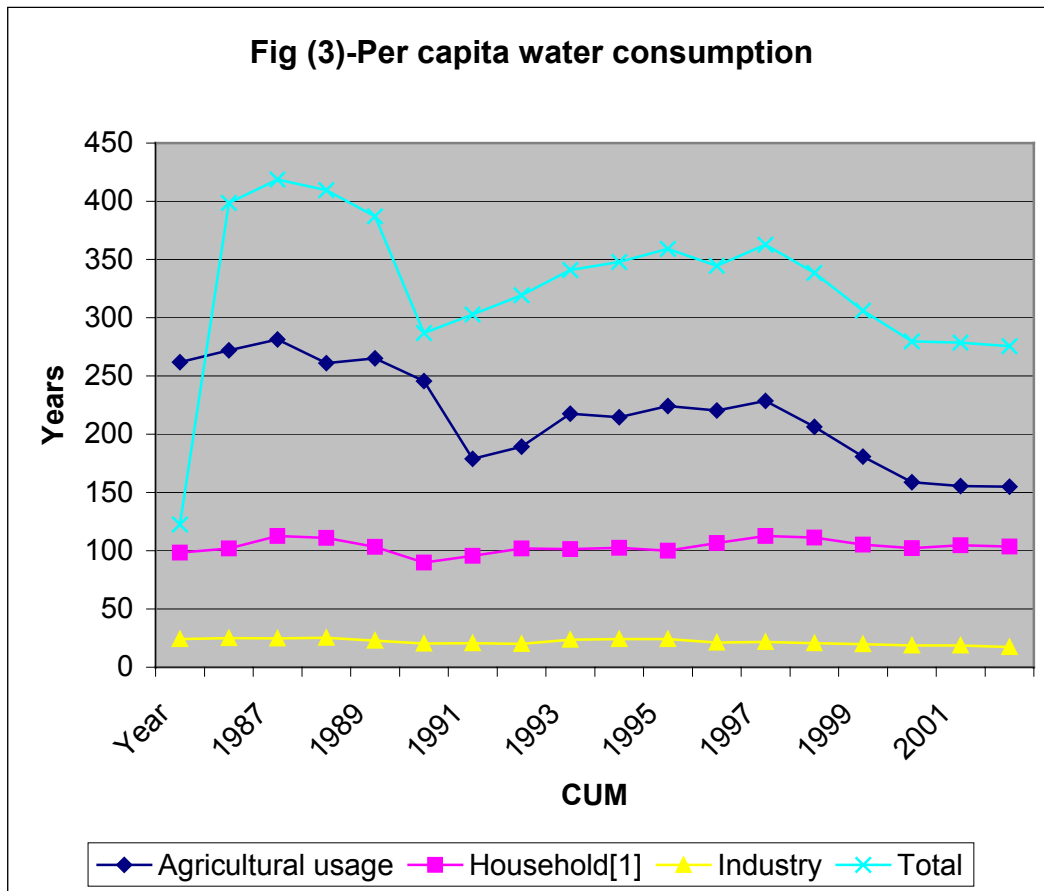
² a. Numbers in prentices are taken from the Ministry of Agriculture, the research and development department (November 1999). These numbers do not always agree with the figures provided by the water authority (1999).

b. Total consumption includes 195-235 million m³ that are transferred to Jordan and Palestine. Kislev and Veksin (1997) argue that rain water potential is about 2000 million m³ and additional quantity should come from residual water (recycling and salty water) or desalinized water

³ Measurement of water consumption by households includes the individuals' usages plus watering of gardens.

Table 6 - Water per capita consumption and per capita consumption by usage sector

Year	population	Agricultural usage	Household[1]	Industry	Total
1986	4299	262	98	24	123
1987	4369	272	102	25	399
1998	4442	281	113	25	419
1989	4518	261	111	25	410
1990	4660	265	103	23	387
1991	4949	246	90	20	287
1992	5124	179	96	21	303
1993	5261	189	102	20	319
1994	5399	218	102	24	341
1995	5545	215	102	24	348
1996	5685	224	100	24	359
1997	5829	220	107	21	344
1998	5971	229	113	22	363
1999	6125	206	111	21	338
2000	6289	181	105	20	306
2001	6439	159	102	19	280
2002	6570	155	105	19	279
2003	6748	155	103	17	276



Sources: <http://courses.agri.huji.ac.il/71721/kislev-atlas2.pdf>. Calculated from the Water Commission report 2004, The Research and development department (September, 20, 2000), A report submitted to general manager of the agricultural ministry

Table 7 summarizes water supply by source for the years 1990 and 2000-2002, and Table 8 presents water balances (input and output). In 2000, the excess of demand was addressed by increases in pumping from the Sea of Galilee. This choice was far from being optimal and the lack of Galilee dried and lost its attractiveness as a vocational place.

Table 7- Water Production by Source and Supplier (million cum)

	1990	2000	2001	2002
Production				
TOTAL	1,939	1,996	1,885	1,912
Mekorot Water Co.- total	1,232	1,341	1,286	1,298
Other producers – total	707	655	599	614
From wells ⁴	1126	1056	1063	1071
From the National Water Carrier(HaMovil, Kinneret)	153	230	160	152
Surface water	501	441	386	401
Effluents ⁵	159	269	276	288

Calculated from the Water Commission report 2004, Table 12 (Detailed figures are presented in Annex)

The overproduction of water in 1997-2001 caused a severe deficit in water resources. In 2002-2003 the water annually sustainable water supply finally exceeded due to favorable rainy years and additional reduction in the agricultural quotas. Alas, the two rainy years did not succeed to fully compensate for a prolonged overdraft, which led in some cases to an a deterioration of water quality and salinization of aquifers – particularly the coastal aquifer. Table (8) presents water extraction and recharge and the ensuing deficit for the period 1997-2003.

Table 8 - Input, output and deficit in the market of water for the years 1997-2003

Year	Pumping	Water returned	Deficit-/surplus +
1997	1961	1801	-160
1998	2045	1833	-212
1999	2144	1827	-317
2000	1930	1531	-399
2001	1778	1390	-388
2002	1970	2041	+71
2003	2043	3037	+994

Source: Calculated from the Water Commission report 2004.

The water commissioner had adopted 4 measures aimed at handling the water crisis: a) increasing the price of water, b) reducing irrigation water quotas, c) encouraging households to save water and d) building infrastructure for water desalination.

Water Pricing

The price of irrigation water varies with quantity consumed but not with location. Farmers pay about \$0.18 per m³ for the first 50% of their water quota, \$0.22 for the next 30% and \$0.30

⁴ Excluding production from drilling for Dan Region Sewage Reclamation Plant.

⁵ Including Dan Region Sewage Reclamation Plant

for the last 20% (1995 prices). Industry pays about \$0.22-\$0.25, and households pay on average \$1 per m³ (with high variability among municipal districts, towns and cities). The price of irrigation water has barely changed since 1948 until mid 70 's. In 1973 the price of irrigation water raised by about 5% and in 1976 it increased sharply by about 26%. The 1976 price were held constant until 1980. In 1980 Prices rose again by about 20%, then reduced until 1986, at which time irrigation water quotas had been reduced by 10% and water price rose again. In 1991 the price was raised again by about 24%. The increase of prices of water for agricultural usage in 1986 and the reduction in the quotas allocated decreases the consumption the agricultural sector by 28% (16.4% in addition to the administrative steps).

In 1995 growers paid 0.484, 0.584 and 0.783 NIS for the first 50% of their quota, 51% to 80% of their quota and above 80% of their quota, respectively. In 2002 these tier prices (for the same quota shares) almost doubled to 0.892, 1.07 and 144.3 NIS respectively (the dollar to NIS exchange rate changed during that time from 3.3 to 4.4 -- a rise of 33% and the euro to NIS changed by 42%). The real increase in water price (taking both inflation and exchange rate into consideration) deteriorated the profitability of agricultural growers both in the domestic and export markets.

Administrative steps reduction of quotas

According Israel's water law of 1959, water permits and prices are determined administratively by the water commission, and are changed annually according to precipitation and various needs. About 65 % percent of the water is supplied by a single company – Mekorot, controlled by the government, and the rest by independent suppliers. Water suppliers receive extraction permits with specific and detailed quotas from the Water Commission (Kislev and Rosental, 1997). The ministry of agriculture, then, determines water allocated to the different crops by employing a strategy aimed at: (1) minimizing the long-term damage to the produce and (2) allocation of water according to their marginal value of production.

In 2001 the Water Commission together with the Treasury and Agriculture Ministries agreed that the irrigation water allocation from potable sources will be reduced by 50%. The annual cost to growers due to this reduction was estimated to be around 2.0 billion NIS (0.5 billion USD). After the implementation of the new policy the Israeli agricultural sector lost 0.05 million hectares⁶. 9000 hectares of orchards were uprooted and 15,800 employees lost their jobs⁷. Potable water allocation for cotton and wheat has been reduced drastically (leaving these crops to rely on recycled water and precipitations), vegetables (including potatoes) lost 30% and fruits (including citrus orchards) lost 20% of their fresh water quotas. The ministry of agriculture demanded that farmers should be compensated for their loss of income by 1 NIS (about \$0.22) per m³ or quota reduction. The Treasury Ministry resisted and an agreement was finally reached to a 29% reduction of the 1999 quota.

⁶ One of the informal benefits of agriculture is that it occupies and signal rights on land. Given that the final agreement about the borders of and ownership rights between Israel and the Palestinians hadn't been signed yet, stopping to farm land have a serious political impact.

⁷ The Research and development department (September, 20, 2000), A report submitted to general manager of the agricultural ministry.

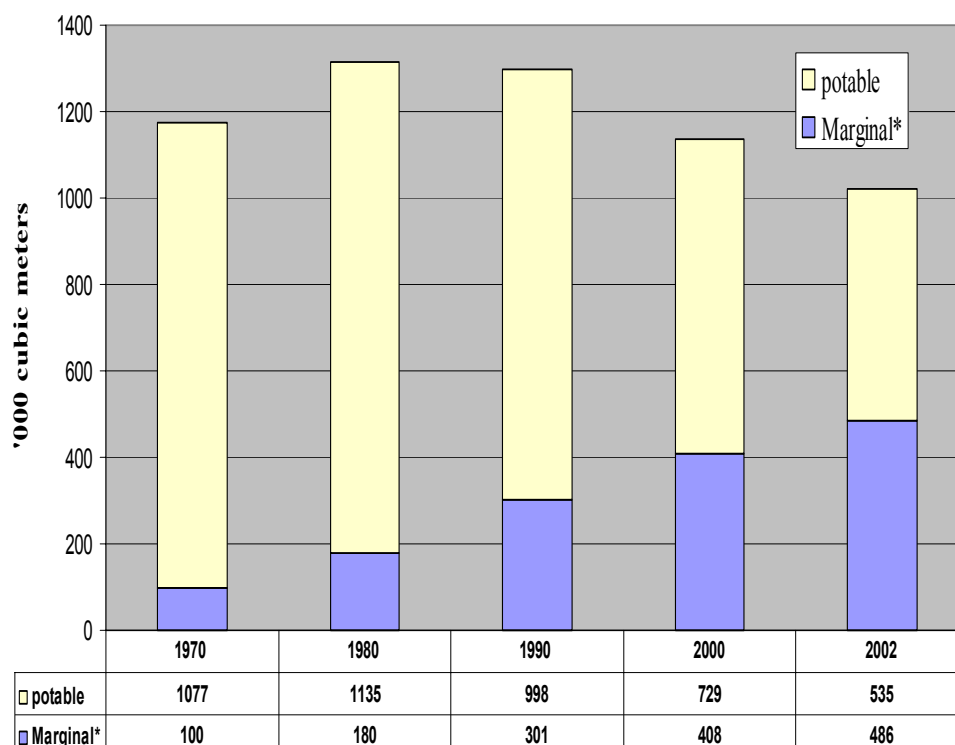
Table 9 - Water reduction (%) in main crops and livestock 1999-2003

	1999	2000	2001	2002	2003
Field crops	100	100	100	100	100
Wheat	50	75	75	75	75
Vegetable –field	30	30	70	70	50
Vegetables greenhouse	0	20	35	35	25
Flowers field	0	20	40	40	40
Flowers greenhouse	0	15	30	30	25
Banana	0		50	50	20
Orchards and citrus	20	25	35	35	25
Fishery	50	50	50	50	50
Poultry and beef raised for meat production		35	35	0	0
Poultry and beef raised for eggs and milk	0	0	0	0	0

Calculated from the Water Commission report 2004

This change required adaptation to different cropping patterns, and increased use recycled and saline water.

Water use for agricultural irrigation in Israel



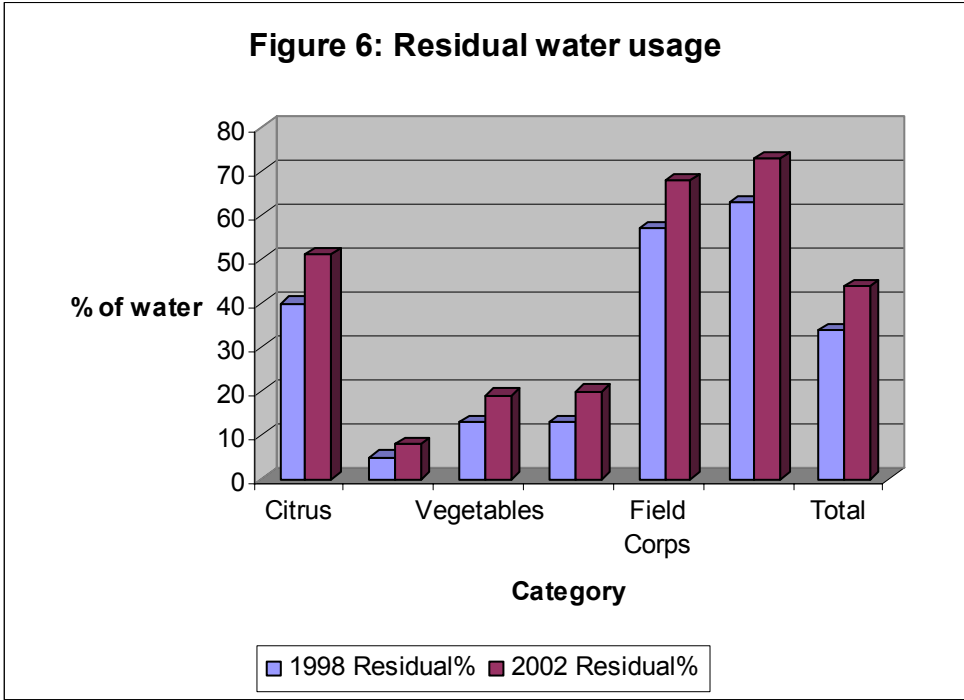
Calculated from the Water Commission report 2004

In 2002 the quantity of drinking water used for irrigation about half of its 1970 level and 53% of its 1990 level. In contrast, the quantity of recycled and marginal water used for irrigation increased from 100 million m³ in 1970 to 486 million m³ in 2002. The pattern of use of marginal (non-potable) water overtime is presented in Table 10.

Table 10 - Use of drinking and marginal water in irrigation between 1998 and 2002

	1998		2002	
	Potable%	Residual%	Potable%	Residual%
Citrus	60	40	49	51
Orchards	95	5	92	8
Vegetables	87	13	81	19
Flowers	87	13	80	20
Field Crops	43	57	32	68
Livestock	37	63	27	73
Total	66	34	56	44

Calculated from the Water Commission report 2004



Calculated from the Water Commission report 2004

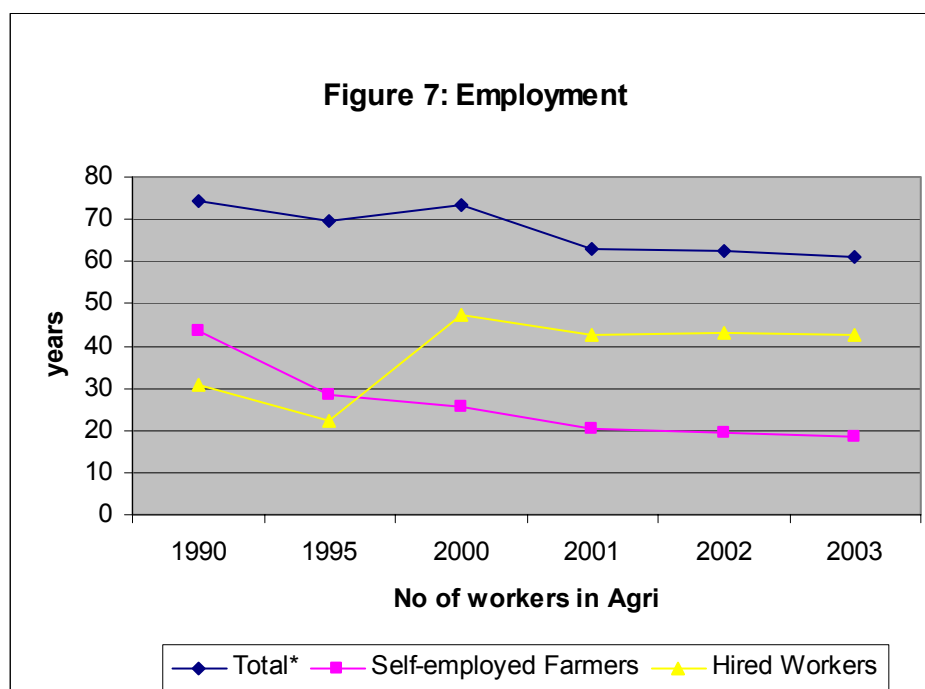
Employment

The structure of Israel's agriculture is currently undergoing a dramatic change. From the idealistic pioneers of the first half of last century, who built the Kibbutzim and Moshavim with the principles of self employment and self maintenance to the a more pragmatic capitalistic rules. The number of agricultural workers in Kibbutzim and Moshavim has steadily decreased over the years, substituted by unskilled hired workers (see Table 11).

Table 11: Employment in Agriculture (Thousands)

	1990	1995	2000	2001	2002	2003
Total	74.3	69.6	73.2	62.9	62.5	61
Self-employed Farmers	43.6	28.5	25.7	20.5	19.4	18.6
Hired Workers	30.7	22.1	47.5	62.9	43.1	42.4
% of Hired Workers of total	41.3%	31.8%	64.9%	67.4%	69.0%	69.5%

Source: Ministry of Agriculture- Annual Economic Report for 2003 (August 2004) p. 38.



Calculated from Table (11)

Of the 61,000 agricultural workers in 2003, only 30% (18,600) were self-employed (i.e., Kibbutzniks or Moshavniks), the rest being hired workers. Shortage of water, a relatively small local market and high technological level of agricultural know-how enable the sector to change the cropping structure towards high added value crops, exported mostly to European markets. These changes dictate high managerial ability, capital intensive production technology and cheap labor.

B. Principal characteristics of agro-ecological zones

Climate Classification

Map 2 classifies the land of Israel using the **Köppen Climate Classification System** - a widely used system. The categorization is based on the annual and monthly averages of temperature and precipitation. The Köppen system defines five major climatic types; each type is designated by a capital letter.

Israel's climate varies from a *dry climate* (B) in Beer-Sheva, the Negev, and the Jordan valley to *Moist Mid-latitude* in the central and northern regions. The Dry Climates (B) is divided into

two groups; BW - dry arid (desert) and BS - *dry semiarid* (steppe). Climates with Mild Winters (C), include Israel's coastal plane, the Northern Valleys and the Galilee, and it divided to three groups; : Cfa - *humid subtropical*; Cfb - *marine*. and Cs – Mediterranean.

Subtropical Desert and Steppe BWh and BSh climate dominates the Negev region and Beer-Sheva regions respectively. Regions with BWh and BSh climate have the following common climatic characteristics:

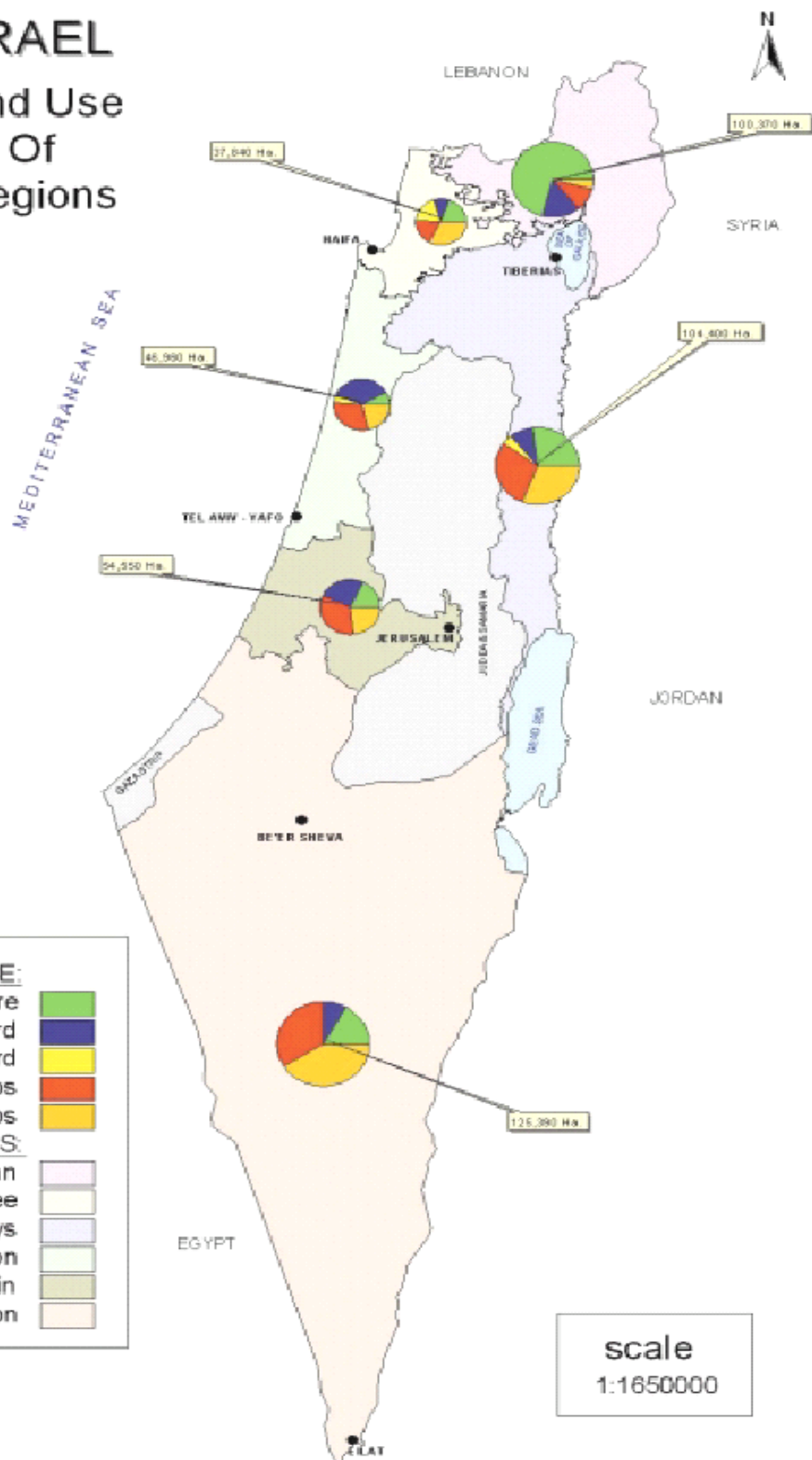
- Low relative humidity and cloud cover.
- Low frequency and amount of precipitation.
- High mean annual temperature.
- High monthly temperatures.
- High diurnal temperature ranges.

Mid-Latitude Desert and Steppe BSk climate is dominate in Nizzana region, it dominated by Continental Tropical air masses during summer and Continental Polar in winter; regions with this climate have the following similar climatic characteristics:

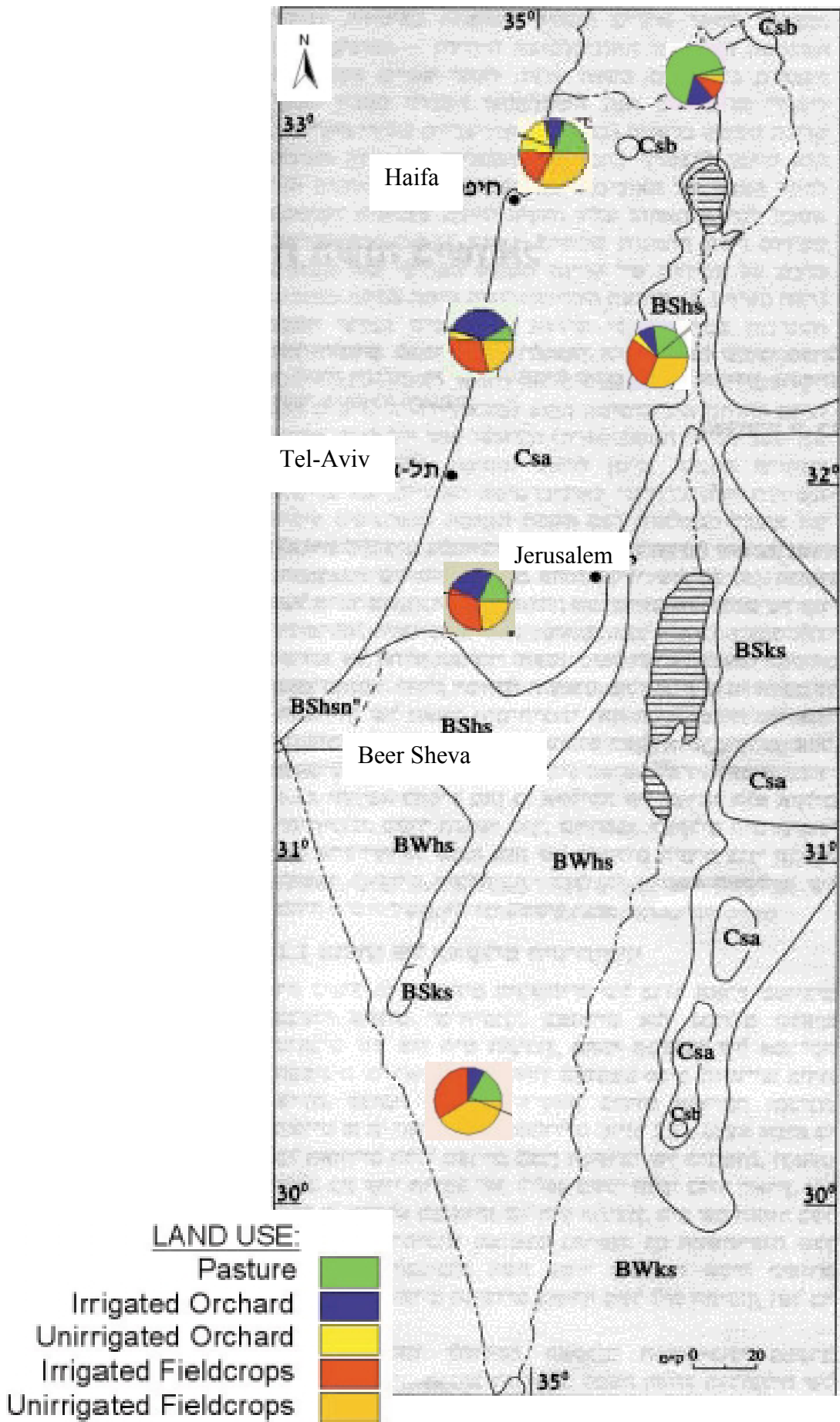
- Low relative humidity and cloud cover.
- Low frequency and amount of precipitation.
- Moderate to high annual temperature.
- Moderate to high monthly temperatures.

MAP OF ISRAEL

Agricultural Land Use By Ministry Of Agriculture Regions



edited by
Omer Ben Asher



Northern Galilee (Zfat)- Csb climate : Height : 937 M., Annual precipitation : 728 mm.
Average annual Temp. 16.1 °C

Month	1	2	3	4	5	6	7	8	9	10	11	12
precipitation	195	172	72	35.6	15.9	0	0	0	2.1	16	80	139
Temp.	7.2	8.9	11	15.6	20.3	22.9	24.3	25	23	23	16	10

Haifa (on the boarder between western Galilee and the central region) - Csb climate:
Height : 300 M, Annual precipitation : 661 mm, Average annual Temp. 18.8 °C

Month	1	2	3	4	5	6	7	8	9	10	11	12
Precipitation	183	123	45	23.5	8	0	0	0	0.4	23	95	161
Temp.	11.9	12.2	14	16.9	20.4	22.6	24.3	25	24	22	19	13.8

Tel – Aviv (center of the central region): Csa climate, Height : 3 M, Annual precipitation : 519 mm, Average annual Temp. 19.1 °C

Month	1	2	3	4	5	6	7	8	9	10	11	12
Precipitation	124	89.9	34	13.8	2.3	0	0	0	3.3	18	83	150
Temp.	13.2	13.2	15	16.5	20	22.6	24.7	25	24	22	19	14.7

Jerusalem (central plain and mountain) Csa climate : Height : 785 M. Annual precipitation : 509 mm, Average annual Temp. 17.1 °C

Month	1	2	3	4	5	6	7	8	9	10	11	12
Precipitation	140	129	67	23.2	3.4	0	0	0	0.6	9.5	52	84.9
Temp.	8.8	9.5	11	15.5	20.8	22.4	23.6	24	22	20	16	11

Beer-Sheva (North Negev region): BShs climate, Height : 270 M, Annual precipitation : 200 mm, Average annual Temp. 19.5 °C

Month	1	2	3	4	5	6	7	8	9	10	11	12
Precipitation	47.9	40.8	31	7.4	4.3	0	0	0	0.3	4	25	39.6
Temp.	11.6	12.4	14	17.9	22.8	24.6	26.2	26	24	22	19	13.5

Beer-Sheva BWhs climate, Height : 5 M. Annual precipitation : 30 mm, Average annual Temp. 25 °C

Month	1	2	3	4	5	6	7	8	9	10	11	12
Precipitation	1.6	6.1	6.2	4.2	1	0	0	0	0	0.2	1.6	9.1
Temp.	15.5	16.8	20	24.3	28.8	31	33	33	31	27	22	16.9

Source: <http://info.smkb.ac.il/home/home.exe/5664/5672>

C. Farm structure

	1995	1996	1997	1998	1999	2000	2001	2002	2003
GRAND TOTAL	5,612.3	5,757.9	5,900.0	6,041.4	6,209.1	6,369.3	6,508.8	6,631.1	6,748.4
<i>Urban localities</i>	5,101.9	5,246.6	5,383.3	5,519.2	5,675.8	5,830.0	5,964.1	6,074.7	6,186.3
<i>Rural localities</i>	510.4	511.2	516.6	522.2	533.3	539.2	544.7	556.4	562.1
Moshavim	165.4	169.8	174.7	178.7	184.5	189.8	196.4	202.6	206.5
Collective moshavim	13.4	15.5	15.9	15.9	16.2	16.6	17.2	15.8	16.7
Kibbutzim	118.9	116.8	116.5	115.5	115.7	115.3	115.5	115.6	116.2
Institutional localities	12.4	12.6	12.5	12.2	12.0	11.8	11.6	11.7	10.8
Communal localities	55.0	58.2	62.0	65.4	69.4	72.1	72.5	76.1	75.8
Other rural localities	94.0	87.5	84.8	83.0	82.6	75.5	75.5	76.7	75.7
Living outside localities	51.3	50.7	50.3	51.5	52.9	58.1	56.0	57.9	60.4

Source: Statistical Abstract of Israel 2004 No 55, table 2.12, Localities and Population, by Type of Locality and Population Group (www.cbs.gov.il).

It is seen from Table 12 show that the population growth in the moshavim is higher than average growth. However, much of this growth is due to city dwellers that move to Moshvim in a pursue of improved living standards rather than as farmers.

Table 13: Rural Population 1999-2203

	1999		2001		2002		2003	
	Villages	Inhabitants (000)	Villages	Inhabitants (000)	Villages	Inhabitants (000)	Villages	Inhabitants (000)
Total	1981	633.3	1196		1196		1187	
Cooperative villages – subtotal	722	318.4						
Kibbutzim	268	115.7	268	115.6	268	115.6	266	116.2
Moshavim	411	184.5	409	186.4	409	202.6	408	206.5
Collective Moshavim	43	18.2	43	17.2	42	15.8	43	16.7
Non-cooperative villages - subtotal	259	314.9	259	225.6	257	222.4	255	217.3

Source: Statistical Abstracts of Israel 2000, 2004

There are three forms of agricultural settlements: the kibbutz, cooperative moshav and ordinary moshav. Roughly speaking, they used to differ based on their sharing rules. Members of a kibbutz shared the means of production, marketing and consumption. Members of a cooperative moshav shared the means of production and marketing but not of consumption, whereas members of an ordinary moshav share some infrastructure capital and the marketing. As was mentioned above, these institutions currently undergo major changes in a number of directions and we'll have to wait some time to see where this process is heading to.

The Kibbutzim and Moshavim control the lion share of the Israeli rural areas and dominates the agricultural production even though their own social structure and objectives changed dramatically over the last 40 years. The Jewish pioneers that came to Israel at the beginning of the 20th Century came from eastern Europe (mostly Russia) and were motivated by socialist ideologies of that time. These settlers established the early kibbutzim and their successors formed most of the Moshavim.

In 1950 - 1960 large immigrant waves arrived to Israel from North African and Iraq. Some of them were directed or chose to work in agriculture and founded Moshavim. Each household received a small piece of land of about 4 hectares. The purpose was mainly to provide employment for some of the new immigrants. Aside from Kibbutzim and Moshavim, private farms are rare and take place mostly between Israeli-Arab villages.

D. Agro-industrial structure overview

Table 13: Output by Industry Level: 2002 and 2003

Industry (division)	Revenue (NIS million)		from total%	
	2002	2003	2002	2003
GRAND TOTAL	231,854	233,628	100%	100%
Mining of minerals and quarrying of stone and sand	5,017	4,657	2.16%	1.99%
Food products - total	31,805	32,683	13.72%	13.99%
Beverages and tobacco products - total	7,030	7,383	3.03%	3.16%
Textiles - total	7,033	6,842	3.03%	2.93%
Wearing apparel	3,544	3,016	1.53%	1.29%
Footwear, leather and leather products - total	665	689	0.29%	0.29%
Wood and wood products (excl. furniture) - total	2,033	1,969	0.88%	0.84%
Paper and paper products	5,335	5,328	2.30%	2.28%
Publishing and printing	8,660	8,546	3.74%	3.66%
Chemicals, chemical products and refined petroleum - total	38,929	42,674	16.79%	18.27%
<i>Plastic and rubber products</i>	11,927	13,013	5.14%	5.57%
<i>Non-metallic mineral products</i>	6,955	6,567	3.00%	2.81%
<i>Basic metal - total</i>	4,271	4,304	1.84%	1.84%
<i>Metal products - total</i>	18,950	19,009	8.17%	8.14%
<i>Machinery and equipment - total</i>	9,354	9,140	4.03%	3.91%
<i>Electric motors and electric distribution apparatus - total</i>	4,098	4,221	1.77%	1.81%
Electronic components - total	9,664	9,820	4.17%	4.20%
Electronic communications equipment - total	14,140	12,647	6.10%	5.41%
Industrial equipment for control and supervision, medical and scientific equipment - total	24,750	24,701	10.67%	10.57%
Transport equipment - total	9,988	8,682	4.31%	3.72%
Furniture - total	3,887	4,118	1.68%	1.76%
Jewellery, goldsmiths' and silversmiths' articles - total	2,404	2,150	1.04%	0.92%
Manufacturing n.e.c. - total	1,413	1,471	0.61%	0.63%

Statistical Abstract of Israel 2004 No 55, table 20.3, Establishments, Employed Persons, Employees, Revenue, Labor Cost and Wages of Employees, by Industry (www.cbs.gov.il).

Food and products, which include agricultural produce and processed agricultural products, is the second largest industry. The share of the output of the food industry is 13.6%, second after chemicals 18.27%. Food and products plus the beverages and tobacco industry, which captures 3.16%, contribute 16.76% of the industry output.

E. Organization of the professionals in agriculture and agro industry

Until 2005, research, training, information collection and activities that pertain to the agricultural sector had been held by the governmental. Agbiotechnology companies and Seed producers who are perceived as the high-tech of the agricultural activities were excluded from the governmental support plane. The organization of the research, whose support and training programs had been held by the ministry of agriculture, is presented hereinafter:

Ministry of Agriculture and Rural Development

- Inspection (Autonomy)
- Soil Conservation and Drainage Department - Main Office
 - Drainage Department
 - Mapping, Soil Research and Remote Sensing
 - Open Spaces Section
 - Field Department
 - Plant Stability Department
 - Soil Conservation Department
 - Soil Erosion Research Station
 - Soil Conservation & Quality Assurance Centre
 - Agro meteorology Department
- Internal Audit
- Foreign Trade Center
 - Deputy Director - General, Foreign Trade
 - Agricultural Minister-Counselor in Europe
 - Agricultural Attaches
 - Foreign Relations Department
 - Import-Export Services and International Trade
 - Export Financings
 - International Trade

- Export Department
 - Import Field
- CINADCO
- Rural Planning and Development Authority
 - Market Research
 - Rural Development
- Veterinary Services
- Accountant
- The Spokesman's Bureau
- Legal Advisor
- Chief Scientist
- Minister's Bureau
- Assistant Director-General, Administration
 - Security
 - human Resources
 - Properties, Building and Stores
 - Organization and Training
 - Welfare
 - Information Technology
 - Budget
- Western Galilee
- Upper Galilee-Golan
- Central Region
- Negev Region
- Northern Valleys
- Central Plain and Mountain

- The Agricultural Research Organization
 - Animal Science
 - Field & Garden Crops
 - Plant protection
 - Institute of Agricultural Engineering
 - Institute for Technology & Storage of Agricultural Products
 - the institute of Soil, Water and environmental sciences
 - Horticulture
 - Gilat - Besor Research Station
 - Central Experimental Station
 - Neve Ya'ar Research Center
 - Research Deputy
 - International Scientific Relations
- Director ,Settlement Law
- Director - General
 - Assistant Director-General, Economics and Production
 - Liaison with Production and Marketing Boards
 - Emergency Economy
 - Department of Marketing Agriculture Products
 - Fisheries and Aquaculture Department
 - Maritime Fishing
 - division of sea agriculture
 - Division of inner water agriculture
 - Division of Fishing Ports and Inspection
 - Plant Protection and Inspection Services
 - Secretary
 - Quality Assurance
 - Field Services Administrator

- Quality Control
 - Field Services
 - Pest Analysis
 - Quarantine Section
 - Chemistry Section
 - Control Section
 - Pesticides and fodder
- Produce and Subsidies
- Agricultural Investment Administration
- Deputy Director General
 - Economic Planning
- Agricultural Liaison - Erez
- Agricultural Liaison Office, Judaea and Samaria
- **Extension Service**
 - Livestock
 - Field Crops
 - Mechanization and Technology
 - Training
 - plant engineering
 - Vegetable Crops
 - Farm Economics and Management Division
 - Citrus & Horticulture
 - field service laboratories
 - Floriculture
 - Field Service

The Agricultural Extension Service

The Agricultural Extension Service (SHAHAM) trains and advises growers and applies research in conjunction with in the R&D institute of the Ministry of Agriculture and Rural Development. Until 2005 the free provision of R&D and training was justified based on its positive external effects. The services focused on applicable know-how to the farming clientele in order to promote the growers over the whole range of their farm-related and production activities. Recently, the extension services has been undergoing a shift toward privatization. The first step will be an experiment of outsourcing three departments of SHAHAM. Surprisingly, so far the outsourcing move has not raised fierce resistance from farmers and the extension service employees.

F. Infrastructure – roads, electrification, communication and ports

Table 14 - Main Socio Economic indicators of the Israeli Society

Socio Economic Indicator	Percent of population
Median age	29.1
Average number of persons per household	3.3
Housing density	0.1
Percent PC owning households	24.6%
Average number of motor vehicle per household	0.62
Average income per capita	1900 NIS
Percent households with holder of academic degree	
Average years of schooling of aged 26-50	12.2
Percent of unemployment	5%
Percent of women not in the workforce	24
Sub minimal wage earners	38.5%

Source: based on the 1999 household survey, CBS.

Transportation

Table 15 presents data on freight volume through airports, sea ports and railways. The lion share of exports and imports is conducted via air. The volume of air-freight is constantly increasing: since 1995 a 17% and 8% increase in export and import, respectively.

Export of citrus, melons and cotton wheat, seeds and oil seeds and import of frozen beef, is carried out mostly via surface freight. Between 1995 and 2002 the volume of freight shipped to and from Israel through sea transportation increased by 27% (loaded- export) and by 29% (unloaded-import).

Table 15: Freight in thousands of tons

	Airports		Ports		Railway
	Loaded	Unloaded	Loaded	Unloaded	
1995	142,515	113,785	10,879	24,904	9,380
1996	152,622	113,411	10,680	23,828	9,111
1997	153,004	117,767	12,214	26,483	8,639
1998	158,995	121,452	13,488	27,274	9,156
1999	166,628	130,453	12,875	28,750	9,936
2000	176,816	159,370	13,866	29,197	10,293
2001	157,498	138,556	13,286	29,695	8,100
2002	167,021	133,742	13,863	31,947	7,889
2003	183,387	123,964	15,069	31,841	7,734
2004(estimate)	198,417	135,112	15,284	32,878	7,630

Source: Monthly Bulletin of Statistics 2,2005 central bureau of statistics of Israel (www.cbs.gov.il).

The Israeli railway system

The share and freight volume transported via railways is declining, mainly because the railway infrastructure is still underdeveloped and an excess of supply of trucks keeps the alternative mode of transportation cheap.

Until 1998, the Ports and Railway Authority was a governmental subdivision of the ministry of transportation, which used its for purposes other than developing appropriate infrastructure. This sad state of affair had changed after the railway system became an autonomous authority. Its immediate goal was to develop public transportation in order to ease the jammed traffic in Israel's big cities. Table 16 presents data on Israel's railway system. Notice, from the third row, that since 1990 there is a decline in non-major routs, included the termination of the Tel-Aviv - Jerusalem line, which has only recently been reopened (in 2005).

Table (16) Israel Railway Services-length of railway lines and revenues

	1990	1995	2000	2001	2002	2003
Length of railway line, standard gauge in km.	574	609	670	684	676	615
Length of sidings in km.	366	249	256	260	263	210
Revenue at current prices in 1000 NIS	102,047	199,769	402,142	390,606	492,658	542,510
Revenue at 1990 prices in 1000 NIS	102,047	123,679	180,600	162,173	186,944	194,187
Revenue from freight (%)	73.3	68.3	40.2	32.3	29.1	27.5
Revenue from passengers (%)	15.2	23.1	49.3	60.1	59.0	65.0
Revenue from other sources (%)	11.4	8.6	10.5	7.6	11.9	7.6

Source: Statistical Abstract of Israel 2004 No 55, table 24.4, ISRAEL RAILWAY SERVICES.

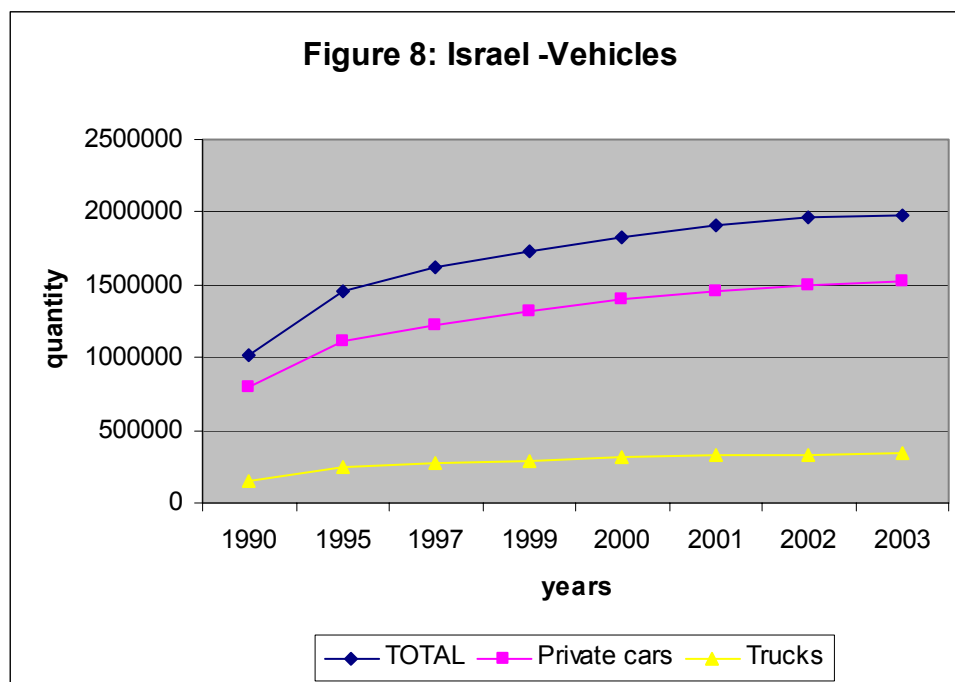
The increment in line length between 2000 and to 2002 was 0.9%, lower than the population growth. The increase in railways length between 1995 and 2000 was an impressive 10%. During this period and the consecutive period the length of siding railway lines increased by 5%. The total revenues increased by 50%, mostly because of the tremendous increase in passengers' transportation. The decline in revenues from freight transportation is the direct outcome of the insufficient and poor design causing the shippers to prefer transportation via road trucking.

Table 17: Motor Vehicles and Population (end of year)

Type of vehicle	1990	1995	1997	1999	2000	2001	2002	2003
TOTAL	1,015,404	1,459,018	1,616,828	1,729,757	1,831,530	1,914,895	1,960,023	1,982,296
Private cars	803,021	1,112,281	1,228,819	1,316,765	1,396,947	1,460,851	1,496,878	1,520,571
Trucks	153,704	246,696	273,795	292,038	309,987	326,428	335,778	337,517
Minibuses	-	11,459	15,239	16,240	16,476	16,752	16,805	16,515
Buses	8,886	10,794	11,095	11,303	11,849	11,897	11,788	11,631
Taxis	8,699	9,449	11,563	13,836	14,806	15,163	15,781	15,788
Special service	3,018	3,644	3,904	3,932	3,993	4,068	4,062	4,086
Motorcycles	38,076	64,695	72,413	75,643	77,472	79,736	78,931	76,188
Population (1000)	4,821.7	5,612.3	5,900.0	6,209.1	6,369.3	6,508.8	6,631.1	6,748.4
cars per capita	0.211	0.260	0.274	0.279	0.288	0.294	0.296	0.294

Source: Statistical Abstract of Israel 2004 No 55, table 24.14, Motor Vehicles, by Type of Vehicle and table 2.1 The Population, by Religion and Population Group. (www.cbs.gov.il)

In 2002 the total number of vehicles (private and commercial) was about 2 millions. The change in the size of the trucking fleet was bigger than in the private cars. Vehicles per capita has stabilized in 2002 (see Figure 8).



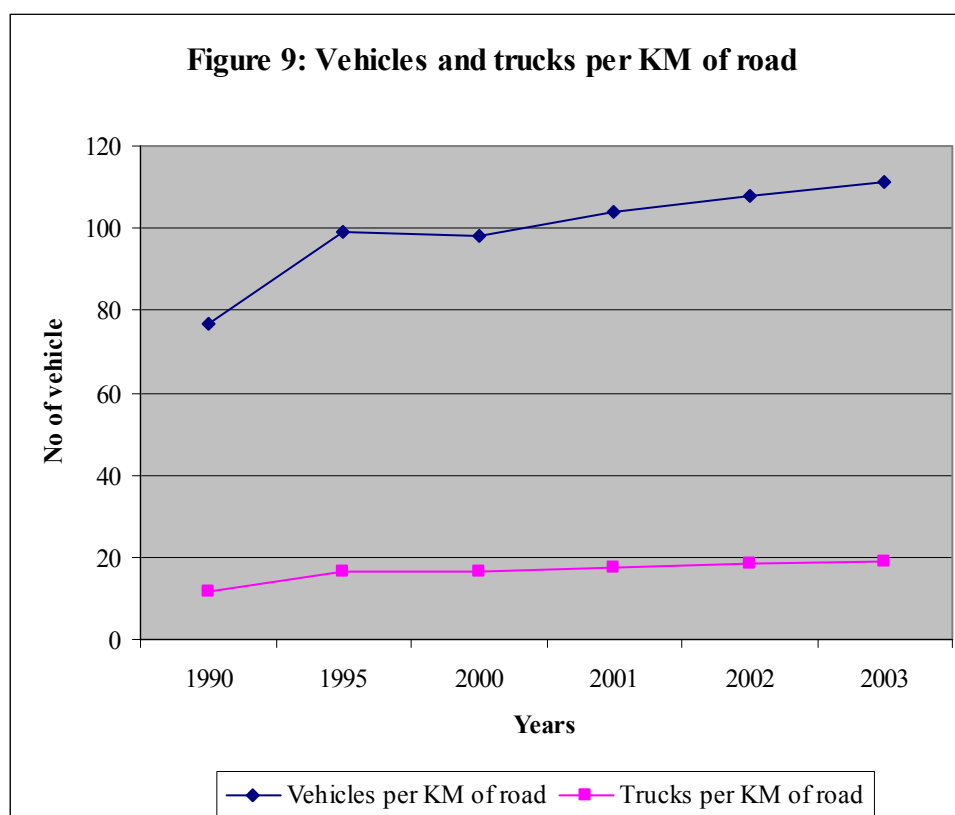
Source: Calculated from Table 17.

Table 18 reveals that inadequate road infrastructure was the main reason for lack of growth of motor vehicles. The number of vehicles per km road is among the highest in developed nations.

Table 18 - Roads, by Length and Area

	1990	1995	2000	2001	2002	2003
	LENGTH (KM.)					
TOTAL	13,199	14,751	16,449	16,676	16,975	17,202
Non-urban roads	4,092	4,845	5,461	5,622	5,849	6,036
Access roads	1,303	1,414	1,544	1,554	1,565	1,573
Urban roads	7,804	8,492	9,444	9,500	9,561	9,593
	AREA (thousand m².)					
TOTAL	87,802	103,072	121,191	124,560	129,189	133,131
Non-urban roads	27,562	33,818	43,692	46,349	50,103	53,249
Access roads	7,603	8,301	9,415	9,559	9,729	9,908
Urban roads	52,637	60,953	68,084	68,653	69,356	69,974
Population (1000)	4,821.7	5,612.3	6,369.3	6,508.8	6,631.1	6,748.4
Length per capita (KM.)	0.0027	0.0026	0.0026	0.0026	0.0026	0.0025
Area per capita (thousand m ² .)	0.0182	0.0184	0.0190	0.0191	0.0195	0.0197

Source: Statistical Abstract of Israel 2004 No 55, Table 24.13, roads (1), by length and area (www.cbs.gov.il)



Source: Statistical Abstract of Israel 2004 No 55, Table 24.13, roads (1), by length and area (www.cbs.gov.il)

Insufficient road infrastructure hampers the increase in the number of cars. The major bottleneck is in the urban centers. The majority of export and imports are done via the Ben-Gurion airport (fruits, vegetables and flowers) and through the seaports of Ashdod and Haifa. All three ports are connected by railway lines. Though currently the inadequate infrastructure is not a binding constrain on export, it may become so in the near future.

Air freight vs. sea freight

Unlike North Africa countries and Turkey, Israel must ship its merchandise via air or sea and to a larger distance. Airfreight is quicker but is more expensive. On the other hand, the longer sea shipments (3-5 days) deteriorates quality. The high price of air transport is economical only for high value crops. The cost of air transport between Israel and France is around \$1200 per ton. Crops such as potatoes, onions, melons and even avocados whose CIF price is below \$1200 can not be airfreight. The quality of potatoes, onions and avocado is not affected by the sea shipments (with avocado it can even be planned to reach the market when ripe). Sea freight melons used to suffer quality deterioration but a recent research (2002) found the right post harvest treatment that solve this problem.

Table 19: Cost of sea and air transportation

	Export by sea	Export by air	Conversion: 1 ton export by sea=
Cost	170\$ per surface	1200\$ per ton	
Potato	100%	0%	0.8 surface
Melon	90%	10%	1.2 surface
Pepper	75%	25%	2.0 surface
Tomato	60%	40%	1.2 surface
Herbs	10%	90%	4.0 surface
Avocado	100%	0%	1.0 surface

Source: Interviews: The Min. of Agriculture and Rural Development, Foreign Trade Center

High value crops with short shelf life, such as herbs, flowers, or tomatoes, are sent via air while others (potatoes, melons, avocados, citrus) are shipped via sea.

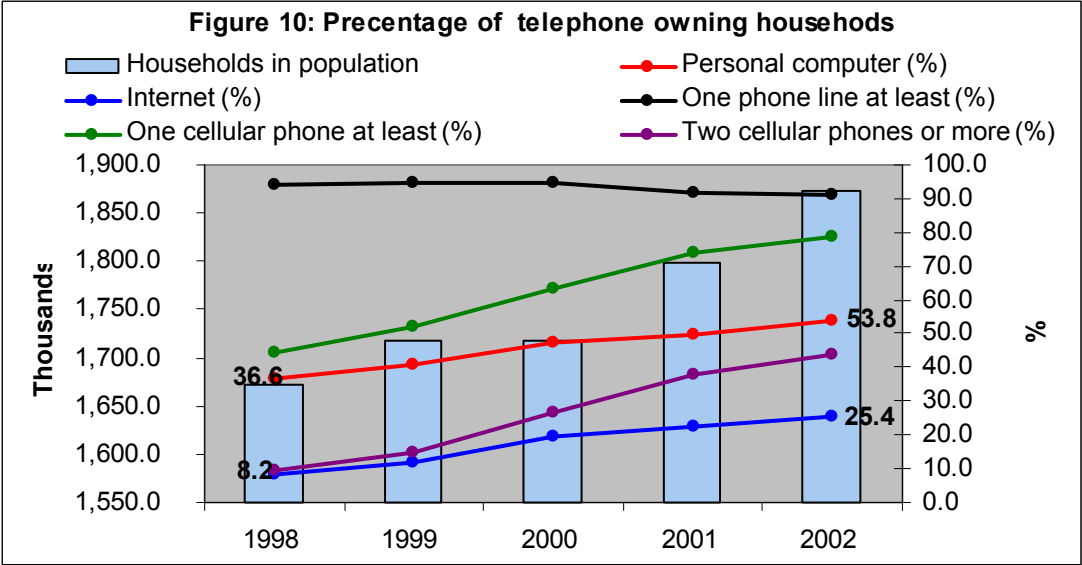
The percentage of ownership of durable goods by Households in population

Table 20 and Figure 10 describe the evaluation in ownership of line telephone, cellular telephone, computers and wideband communication in Israel. In 1998, 94.3% of the household had at least one telephone line, 44% of the population owned a cell phone, 36.6% of the households owned a personal computer, and 8.2% had an internet connection. In 2002 there is an increase of more than 50% in the number of households that own at least one cell phone and the number of household with two or more cell phones increased from 9.9% in 1998 to 44% in 2002. The decline in rates of cellular phone use and the convenience of communication lead to decline in line phone use.

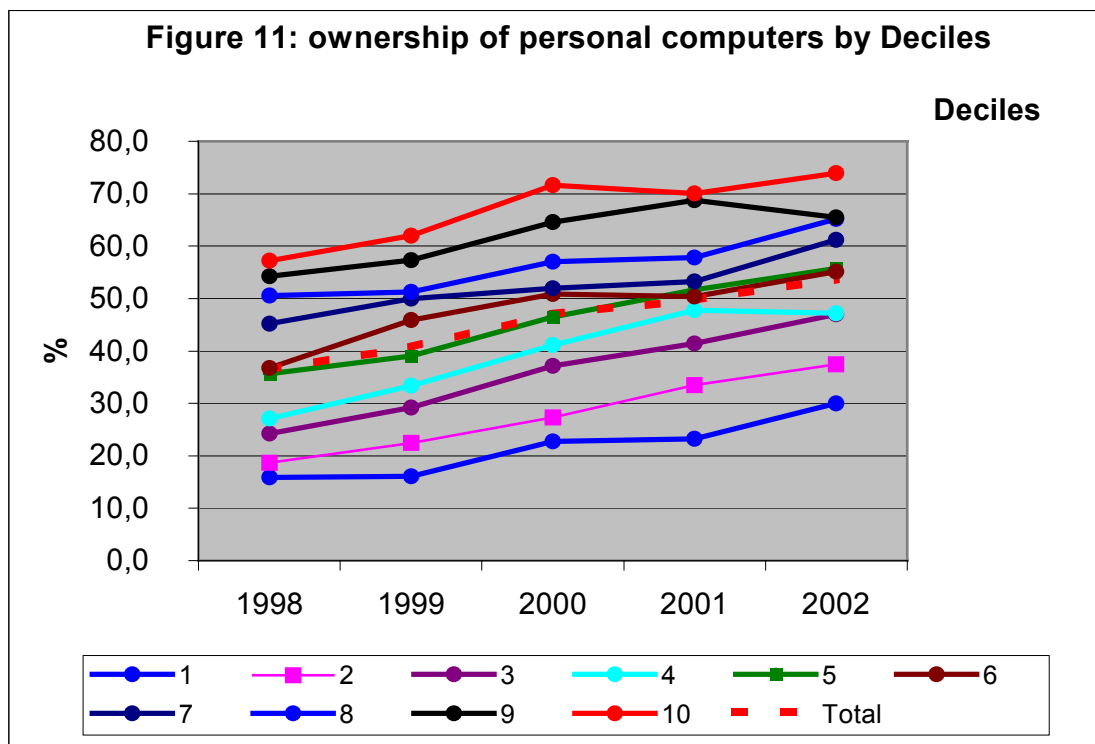
Table 20

	1998	1999	2000	2001	2002
Households in population (thousands)	1,671.4	1,717.0	1,717.0	1,799.4	1,872.6
Personal computer (%)	36.6	40.7	47.1	49.8	53.8
Internet (%)	8.2	11.9	19.8	22.5	25.4
One phone line at least (%)	94.3	94.4	94.4	91.7	90.9
One cellular phone at least (%)	44.5	52.3	63.5	73.8	78.8
Two cellular phones or more (%)	9.2	14.5	26.8	37.7	44.0

Statistical Abstract of Israel 2000-2004 No 51- 55



PC ownership increased from 36.6 % of households in 1998 to 53.8 % in 1992.



Source for Figures 10 and 11 is Table 20.

The uneven distribution of communication and the higher percent of adopters characterizes telephone ownership in Israel. Cell phone ownership in high income households is above 90%, and more than 50% of them own multiple cell phones.

This suggests that Israelis are more than happy to adopt new technologies. The rate of adoption and the diffusion level of new technologies is high compared to other developed nations. Compared to the diffusion of cell phones in the USA during 2002, the Israeli rate was 50% higher. Application these findings to the agricultural sector is not straightforward. Farmers and individuals who are self employed and own an average size farm earn less than the average income. If they are 50 years or older, the adoption likelihood is below average. Younger farmers are more likely to adopted new technologies.

The adoption of communication technology and IT by Israeli flower growers enabled the online marketing to Dutch flower markets. The majority of flower growers (more than 90%) use computers with broad-band connection.

Education

The absolute number of pre-college and university students is steadily increasing, but as a percent of the population it fairly constant. The number of students attending agricultural secondary schools declines over time.

Table 21 – number and percent from population of pre-college, college and university students

	1969/70	1979/80	1999/00	2002/03	2003/04
Kindergartens	107668	246600	294384	308057	310000
Primary Education	394354	436387	558640	566980	567558
Intermediate schools	7908	72792	195024	191208	189006
Secondary schools total	129436	143810	272267	286473	285520
Thereof					
General	63731	61583	153405	166683	168802
Technological/vocational	49556	70681	115224	116553	113703
Agricultural	7641	5108	2892	3237	3015
Post-Secondary Institutions	11894	25341	47211	50699	52655
Non University Institutions for Higher Education			53089	67917	71761
Universities	35374	54480	113010	120870	124805
Other Institutions	26300	44000	40305	48225	49500
Average Population-Millions	2974	3877.7	6289.2	6689.7	6806.2
Percent of higher education students	0.0025 %	0.0032 %	0.0040 %	0.0043 %	0.0044 %
% of students from total population	0.0280 %	0.0299 %	0.0293 %	0.0288 %	0.0284 %
% growth in university students		4.4%	7.6%	2.3%	3.3%
% growth non universities		5.3%	7.8%	7.5%	4.4%
% growth of population		2.7%	5.0%	2.1%	1.7%

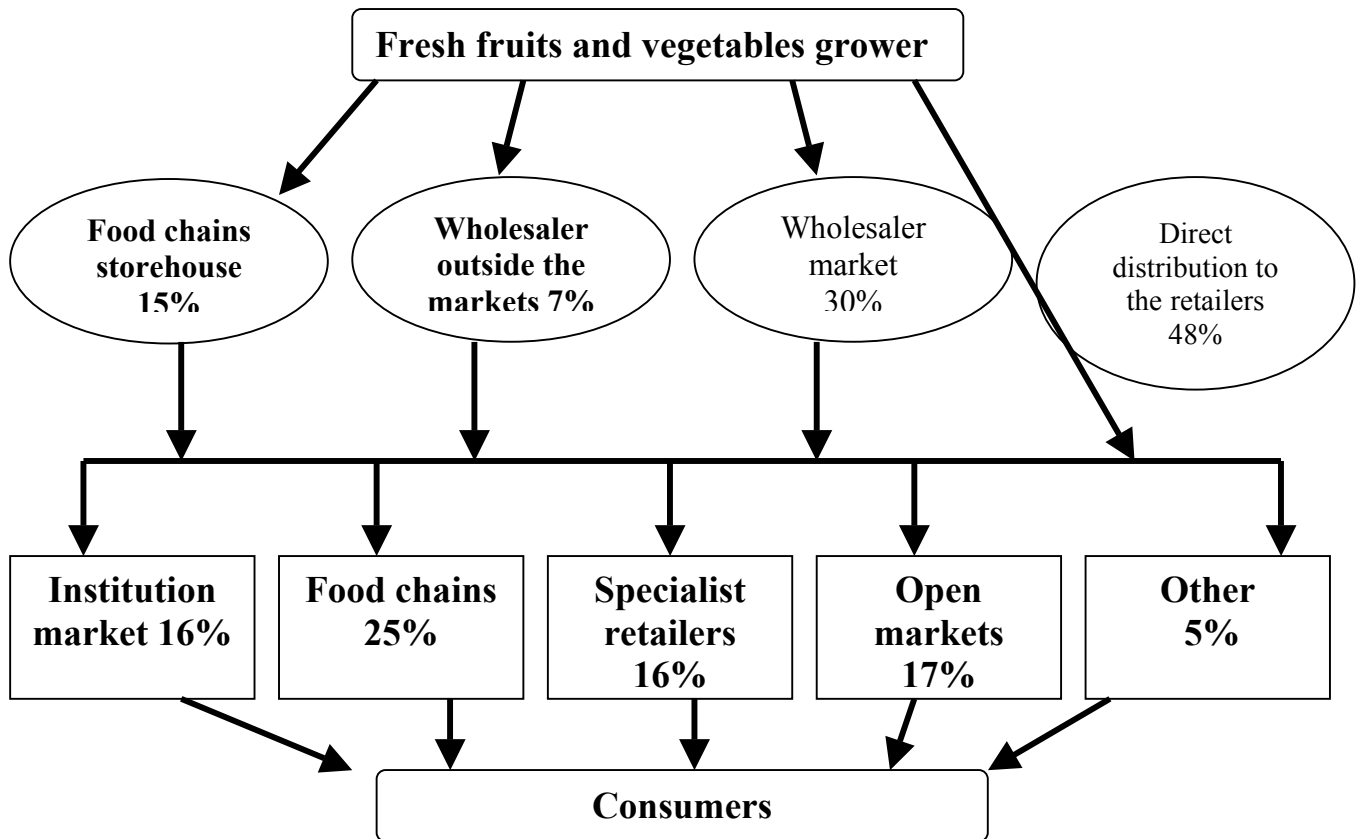
Source: Statistical Abstract of Israel 2004 No 55, Table 8.12.

Summary

Israel is an high-tech country. The blooming of high tech and biotech industries in addition to the growing size of the financial and services sectors competes with the agricultural sector that offers relatively low wages. The very fast and intensive adoption of new technologies makes Israel an interesting laboratory for new technologies for many of the international firms. This should operate to convert the traditional agricultural into a sophisticated sector, based on R&D with a focus on the development of new technologies and varieties.

G. Marketing system

Figure 12: Distribution channels and marketing system for horticultural products



Source : Znobar (2000) <http://courses.agri.huji.ac.il/71719/znobar1.pdf>

Production

The kibbutzim account for 80% of the production of fresh produce consumed locally (Znobar, 2000). The share of kibbutzim's income derived from agriculture has been declining and is around 22% , the remaining 78% being derived from tourism and industry. The share of moshavim's income derived from agriculture is about 20%.

Storage

The production and marketing boards are entitled to build and operate storage capacity sufficient to store the excess supply and guarantee sufficient supply of vegetables and fruits. In addition to the marketing boards the retailing chains have their own storage infrastructure. The storage capacity of the three largest chains is estimated around 270 thousand tons (Znobar, 2000).

Marketing

The majority of agricultural produce is distributed through packinghouses, owned by cooperative of growers or by private entities. Packinghouses classify and pack the produce and then sell it to local wholesalers or directly to the retailers (supermarket chains). If the produce is exported then the packinghouse is just another stage in the distribution channel.

The classified and packed produce is then exported by one of the export companies. Three large export companies account for the majority of export: Agrexco, Medadrin-Tnuport and Arava growers. In addition to these three large exporters there are about dozen small exporters who specialize in one or two crops: Diklaim – dates, Eden – Avocado, Tropigarden – exotic fruits, Mor-Persimmon and Mango.

Some 22 packinghouses specialize in citrus, while others specialize in avocado, potatoes, persimmons and mangos.

Wholesalers

There are 6 wholesale markets in Israel and about 140 active wholesalers who operate in these markets - 50% in the Tel Aviv wholesale market – distributing some 720 thousand tons of agricultural produce. An average wholesaler in the Tel Aviv area distributes about 2500 tons annually, which is lower than the European average. During the last decade there has been a tendency toward consolidation. The biggest wholesaler in the Israeli market is a grower cooperative called Tnuva. Tnuve operates in the wholesaling market through subsidiaries that are on average 50% owned by Tnuva.

In addition to the traditional wholesaler markets there are about 10 delivering wholesalers who are located in rural areas (Katif, Bikorie Sade). The delivering wholesalers account for distributing 150 thousand tons. Most of the wholesalers are commissioners, i.e., they do not buy the product and share risk but sell it and charge on average 15% of the revenue. The commission in Israel is higher than the 10%-12% commission common in Europe and the U.S. (Znobar, 2000).

Brokers

Brokers are intermediate agents that reduce transaction costs and have some part in the negotiation between farmers, packing houses and wholesalers.

Food retailers and supermarket chains

Similar to Western Europe, about 65% of purchases of food, perishables and other non-durable products is carried out in supermarkets . Due to massive consolidation of food retailing and supermarket there are now three large local chains (Supersal- 129 stores, Coop-134 stores, Coop-North 69 stores) and three big discount chains (Mega, Half-Price and Cosmos). The two largest supermarket chains own and operate logistic enters that are similar in their functioning to delivery wholesaler. They purchase directly from packinghouses and distribute the produce to their chains.

Open markets

In every city there is open market that mainly sells fresh produce, processed food, meat and fish. The open markets lost their vitality as of their location which is in most cases in the center of the city. The majority of the merchandize is bought in the wholesale markets, but there are some direct sales of farmers to the open market.

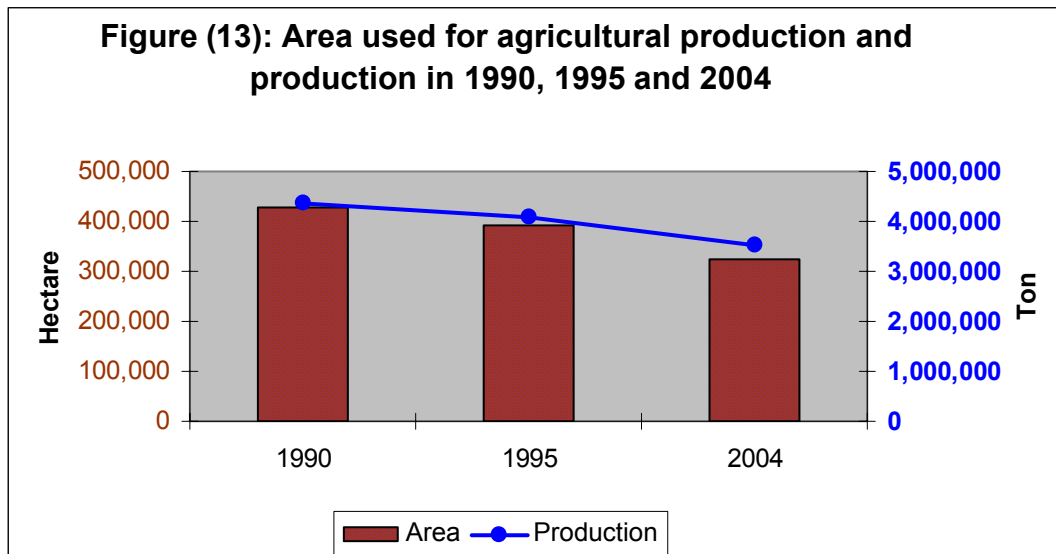
Specializing fruit and vegetable stores and green grocers

There are about 4000 specializing fruit and vegetable stores that account for about 50% of the fruits and vegetables. Specializing stores purchases produce from the wholesale market at a price significantly higher than the price the supermarket chains pays (larger quantity-larger discount). The price they charge is thus higher than the price in the supermarket chains (30% to 50% higher and the difference and can get up to 100% relative to the open market). Their existence is justified by their convenient location, service and better selection. Nevertheless, the number of traditional, ordinary green grocers is declining.

Part 2 - Evaluation of agriculture performance

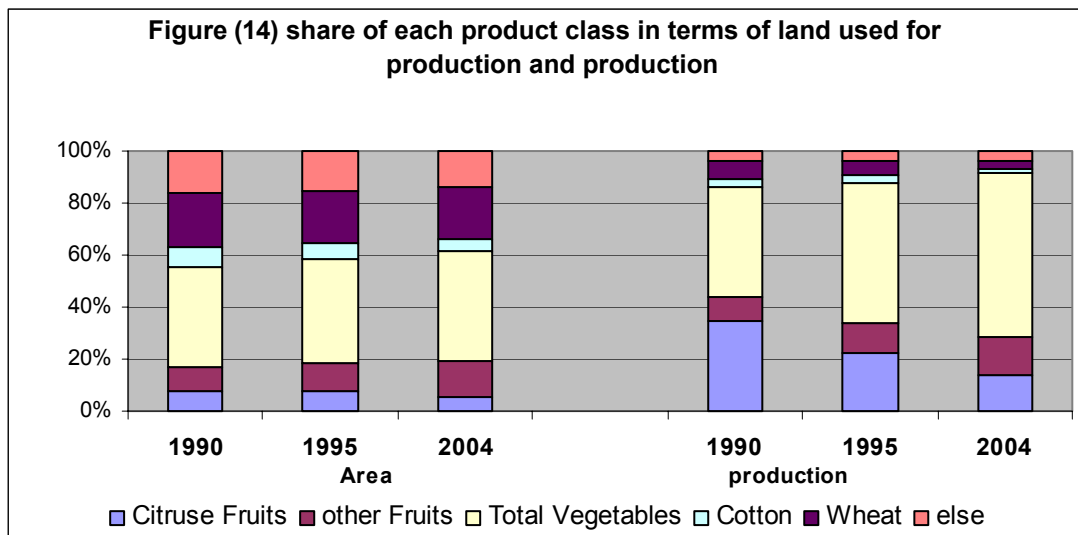
A. Trends in overall patterns yields and production of major crops

Total cultivated area in 1990 was 426,120 hectare and it declined to 325,195 hectare in 2004. Figure 13 depicts the declining cultivated areas between 1990 and 2004.



Source: FAO

The decline in produced output was not uniformly across crops. High value crops, such as vegetables and herbs, are less sensitive to the changes in the economic conditions. The total area used for vegetable production declined in 2004 relative to 1990, but the proportion of its decay is smaller than the average reduction in the cultivated land. The increasing demand for vegetables and the relative advantage of Israeli agriculture in R&D and capital intensive crops justified the continuation of vegetables production, while output of other crops declined more than proportionally to area change.



Source: FAO.

Figure 14 demonstrates that the share of vegetables increases over time both in terms of output and area. The share of area used for citrus growing crashed between 1990 and 2004. In 1990 citrus captured 7.5% of the cultivated land and in 2004 only 5.2%. The decline in the land used for citrus growing was 47%, and the decline in production was 67%. The citrus industry has almost vanished in Israel. From a position of being the largest horticultural crops in 1950, citrus' share fell to 34.5% in 1990 and crashed to 14.2% in 2004. The drastic decline during the 1990s was mainly due to reduction in water quotas. The steep decline in citrus production affects the entire share of the fruit production and area as citrus has been a prominent crop.

Table 22 presents the changes in the area and production of major agriculture produce between 1990 and 2004. The cumulative figures indicate that the area used for agricultural production declined by 24% and output fell by 19%. The largest decline was in citrus (a reduction of 47% in land and 67% in output) and other fruits (16% in area and 48% in output). For example, in 1990 the area of Shamoti oranges was 17450 hectares and fell by 55% by 1995. The Shamoti area continued to decline and was 5200 hectares in 2002. Shamoti output reduced from 871150 Mt in 1990 to less than 279000 Mt in 2004. From 1990 to 1995, vegetables output increased by 21% while its area declined by 14%. Changes in field crops, beside cotton (where reduction in water quotas lead to a sharp decrease) are mixed.

Table 22 - Changes in the area and production of major agriculture produce between 1990 and 2004

Crop	G.R. (1990-2004)		
	Area %	Yield %	Production %
Oranges	-70%	-44%	-83%
Citrus Fruits	-47%	-35%	-67%
Avocados	-31%	98%	35%
Olives	11%	-46%	-40%
Peaches and Nectarines	47%	-4%	41%
Persimmons	31%	-11%	16%
Total Fruits	-16%	-18%	-48%
Cereals (Rice Milled Eqv	-32%	-24%	-48%
Chilies & Peppers, Green	44%	45%	108%
Potatoes	92%	2%	95%
Sweet Potatoes	192%	26%	266%
Tomatoes	-60%	86%	-25%
Vegetables Fresh nes	60%	91%	205%
Melons, watermelons et.	39%	44%	138%
Total Vegetables	-14%	14%	21%
Barley	-66%	281%	30%
Fiber Crops Primary	-59%	-4%	-61%
Maize	-28%	-13%	-37%
Oats	16%	-65%	-60%
Peas, Green	40%	1%	42%
Cotton	-59%	7%	-57%
Sorghum	324%	360%	1849%
Sunflower Seed	95%	-48%	2%
Wheat	-29%	-42%	-59%
Other	-19%	-84%	-34%
total	-24%	-3%	-19%

Source: FAO.

Fruits and vegetables that enjoy marketing advantages, such as peaches, persimmons, sweat potatoes, melons and fresh vegetables, increased their output and cultivated areas. With regard to avocado, technological changes that made the cycling of yield smaller and increases the yield per tree, increased output even though planted area declined. Cotton growers suffered heavily from the reduction in water quotas and were the first to reduce area and production.

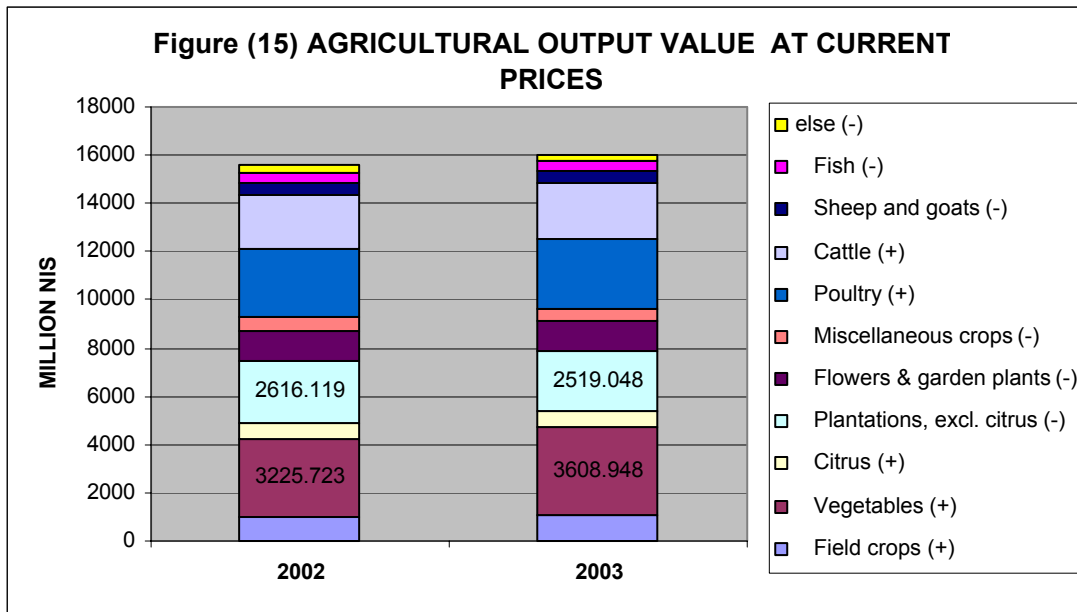
Table 23 - Area, share of area from total cultivated land, yield in term of ton per hectare and total production for the major produce grown in Israel

Crop	1990			1995			2004		
	Area	Yield	Production	Area	Yield	Production	Area	Yield	Production
	Ha	Hg/Ha	Mt	Ha	Hg/Ha	Mt	Ha	Hg/Ha	Mt
Oranges	17,454	499,112	871,150	9,670	362,275	350,320	5,200	278,846	145,000
Citrus Fruits	31,940	1,896,586	1,500,650	29,235	1,291,269	906,430	16,850	1,237,393	498,000
Avocados	8,466	56,697	48,000	7,495	75,717	56,750	5,800	112,069	65,000
Olives	12,650	32,806	41,500	14,310	25,507	36,500	14,000	17,857	25,000
Peaches and Nectarines	2,863	143,905	41,200	3,790	136,385	51,690	4,200	138,095	58,000
Persimmons	1,300	132,308	17,200	800	137,500	11,000	1,700	117,647	20,000
Total Fruits	73,486	4,017,303	1,919,960	72,874	3,486,827	1,390,100	61,705	3,276,271	994,900
Cereals (Rice Milled Eqv)	113,760	34,838	396,320	98,728	31,337	309,380	77,300	26,624	205,800
Chilies & Peppers, Green	1,390	380,576	52,900	1,530	426,261	65,218	2,000	550,000	110,000
Potatoes	6,253	341,996	213,850	8,123	340,884	276,900	12,000	348,083	417,700
Sweet Potatoes	120	364,167	4,370	200	346,000	6,920	350	457,143	16,000
Tomatoes	7,710	675,875	521,100	5,646	892,049	503,651	3,100	1,258,065	390,000
Vegetables Fresh nes	5,693	83,510	47,542	6,800	106,029	72,100	9,100	159,341	145,000
Melons, watermelons et.	14,030	245,420	162,000	20,880	407,486	439,065	19,500	352,232	385,000
Total Vegetables	161,892	7,157,379	1,824,559	156,553	7,948,233	2,192,016	139,585	8,153,588	2,199,595
Barley	14,681	5,245	7,700	11,428	2,013	2,300	5,000	20,000	10,000
Fiber Crops Primary	32,029	16,048	51,400	24,547	17,416	42,750	13,000	15,385	20,000
Maize	6,933	137,935	95,630	6,950	91,698	63,730	5,000	120,000	60,000
Oats	950	10,526	1,000	458	10,917	500	1,100	3,636	400
Peas, Green	2,287	32,357	7,400	2,820	42,908	12,100	3,200	32,813	10,500
Cotton	32,029	41,837	134,000	24,547	46,103	113,168	13,000	44,615	58,000
Sorghum	283	27,915	790	212	40,094	850	1,200	128,333	15,400
Sunflower Seed	7,677	15,305	11,750	12,090	18,528	22,400	15,000	8,000	12,000
Wheat	90,913	32,031	291,200	79,680	30,371	242,000	65,000	18,462	120,000
Other	2,960	787,462	3,645	1,785	49,786	1,780	2,405	124,000	2,410
Total	426,120	12,281,343	4,349,034	393,944	11,784,894	4,083,694	325,195	11,945,103	3,503,205

Source: FAO.

B. Agriculture output value by purpose

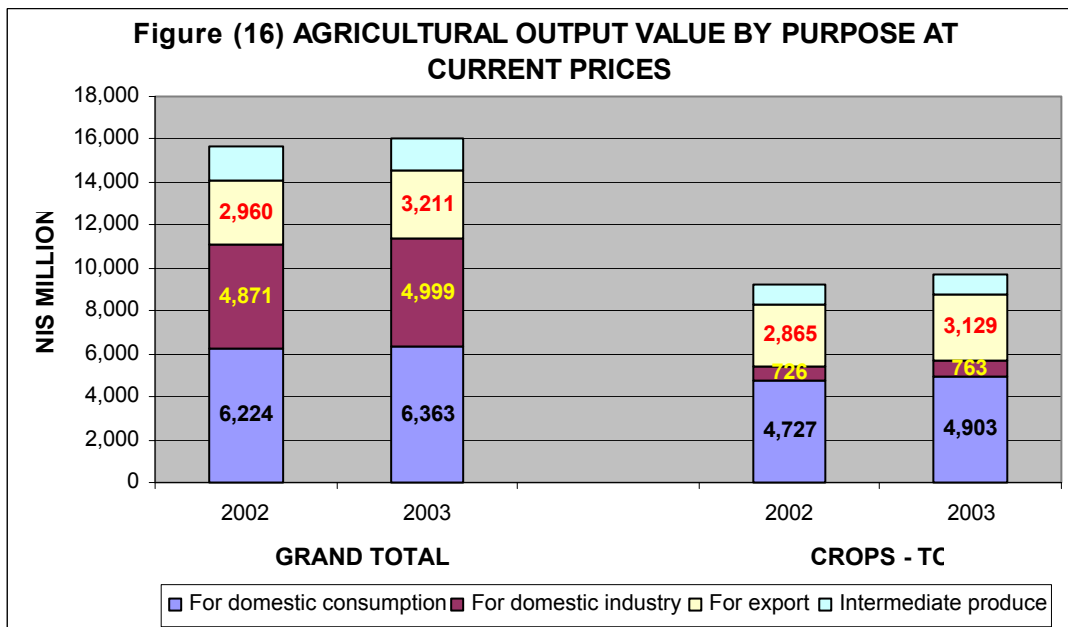
In 2002 the total value of the agriculture sector (direct and indirect) was 15,634 million NIS, of which the value of crops per se was 9,269 million NIS. In 2003, the agriculture sector yielded 16,041 million NIS overall and 9,662 million NIS for agricultural crops (a growth of 2.5%). Figure (15) depicts the change in agriculture output value by crops between 2002 and 2003; (+) indicates growth, (-) indicates a decline in output value.



Source: Statistical Abstract of Israel 2004 No 55, Table 19.16

The output of field crops, vegetable, cattle and poultry increased. Flower, fish and sheep production declined. 2003 was a good year for the citrus industry, due to a climate disaster in Spain. Agricultural output finds its way into one of the following four markets:

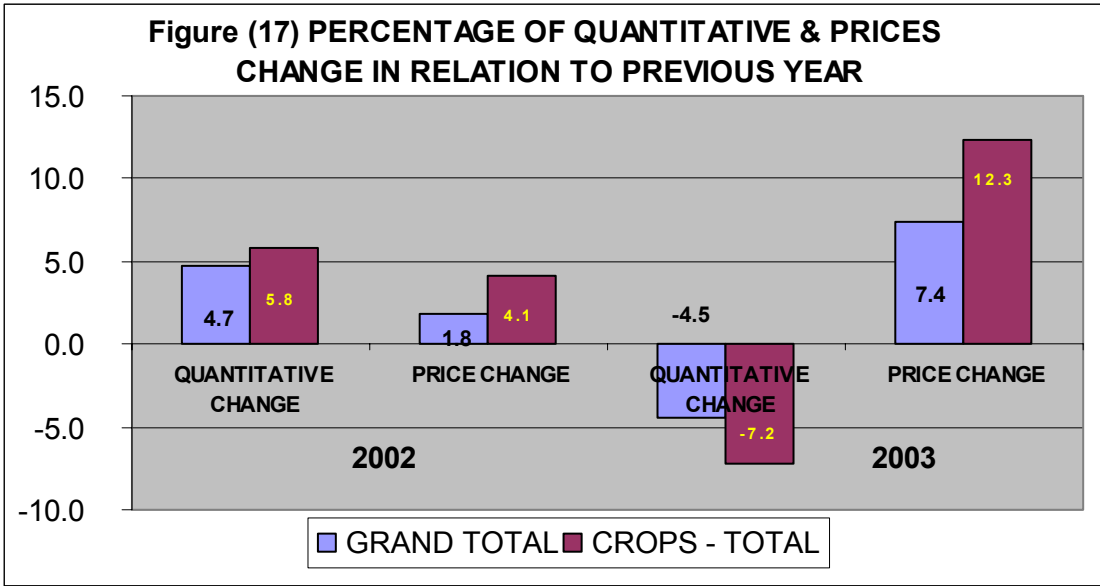
- Domestic consumption.
- Domestic industry.
- Export.
- Intermediate produce.



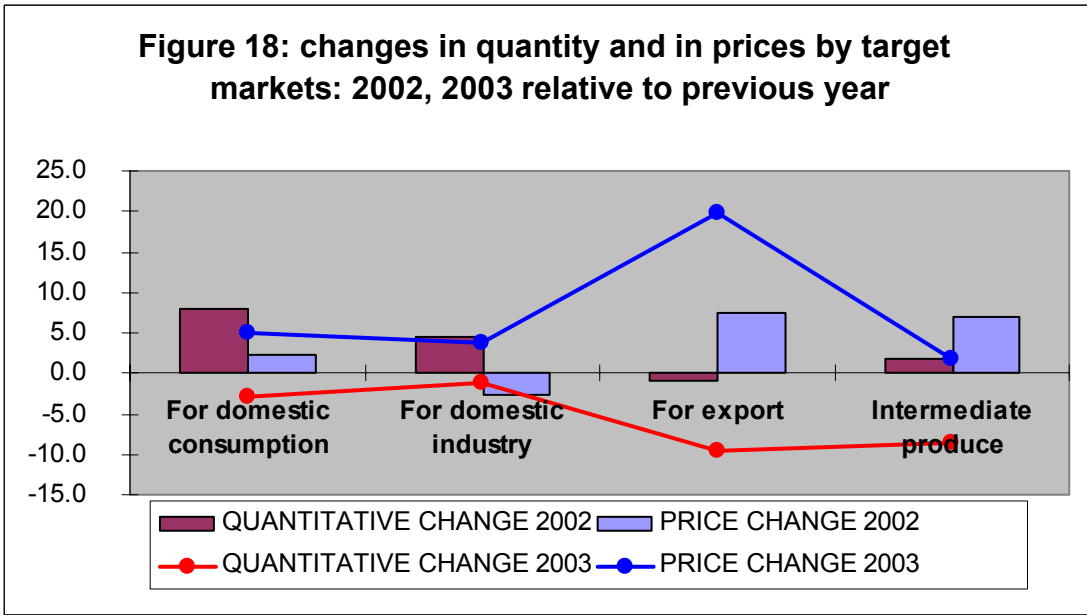
Source: Statistical Abstract of Israel 2004 No 55, Table 19.16

Production in 2003 relative to 2002 was higher in three of the four outlets: domestic consumption, domestic industry and export, and was smaller in production for intermediate products. The output value is the product of multiplication of quantity and prices and since there is a negative relationship between the two it is important to compare the percent of

change of the price and the quantity. The produce quantity in 2003 relative to 2002 declined by 7.2%, and the average price increased by 12.3%. In 2002 both quantities and prices increased relative to 2001.

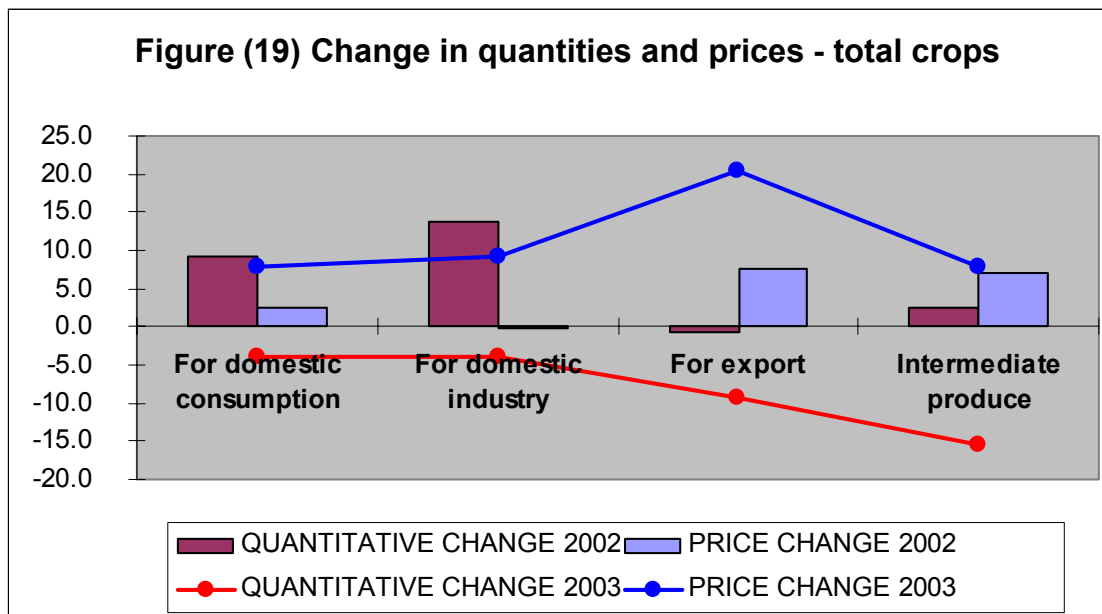


Source: Statistical Abstract of Israel 2004 No 55, Table 19.16



Source: Statistical Abstract of Israel 2004 No 55, Table 19.16

The competition in export markets is stronger than in the domestic market, leading more elastic demand. In 2003 the value of total crop production declined by 10% relative to 2002 and the prices increased by 20%. The average elasticity of demand in the domestic market is smaller.



Source: Statistical Abstract of Israel 2004 No 55, Table 19.16

The change of price in the export markets was the product of two forces: (1) lower quantities and (2) devaluating of the local currency, the NIS, relative to the Euro. During 2002 the NIS was devaluated by more than 10% relative to the Euro. Since the majority of crops are exported to Europe, the devaluation improved the terms of trade for Israeli growers. The stronger demand in the local markets in 2002, caused the industry to shift a larger share of the produce to domestic consumption and pushed prices upward. In 2003, the quantities supplied to the local market went down while prices went up.

Tables 24, 25 and 26 indicate that the majority of crops are marketed to the domestic market and are either targeted for consumption or to domestic industries. Flowers and field crops are exception. Only 22% of the flowers grown in Israel are sold in the local markets. The Israeli flower industry has always been export oriented.

Vegetables are the largest group of agricultural products in Israel. Their production increased between 2002 and 2003. The quantity and the proportion of export of vegetables increased between 2002 and 2003. Fruits, the third group in its size, are also export oriented, due to lower local demand relative to export demand. Poultry and cattle (the second and fourth in value of production, respectively) are grown mainly for local consumption. The remaining product classes are fish, and sheep and goats production are domestic oriented.

Table 24 - Agricultural Output Value, By Purpose NIS Million, At Current Prices-2002

	Total	For domestic consumption	For domestic industry	For export	Intermediate produce
GRAND TOTAL	15,634	6,224	4,871	2,960	1,579
CROPS - TOTAL	9,269	4,727	726	2,865	951
Field crops	1,004	167	169	277	391
Vegetables, potatoes and melons	3,226	2,388	239	540	59
Citrus	624	225	99	281	18
Plantations, excl. citrus	2,616	1,665	198	476	277
Flowers and garden plants	1,233	272	-	960	-
Miscellaneous crops	566	8	21	332	206
Poultry	2,840	471	1,801	40	528
Cattle	2,259	145	2,085	-	29
Sheep and goats	482	358	113	-	11
Fish	447	421	-	26	-
Miscellaneous	337	102	146	29	60

Source- ISRAEL CBS , Agricultural indicators 2004.

Table 25 - Agricultural Output Value, By Purpose NIS Million, At Current Prices-2003

	Total	For domestic consumption	For domestic industry	For export	Intermediate produce
GRAND TOTAL	16,041	6,363	4,999	3,211	1,469
CROPS - TOTAL	9,662	4,903	763	3,129	868
Field crops	1,102	191	229	270	411
Vegetables, potatoes and melons	3,609	2,572	233	762	41
Citrus	680	271	106	290	12
Plantations, excl. citrus	2,519	1,598	172	525	224
Flowers and garden plants	1,214	262	-	952	-
Miscellaneous crops	538	8	23	329	178
Poultry	2,852	464	1,861	32	495
Cattle	2,316	162	2,119	-	35
Sheep and goats	477	358	108	-	11
Fish	425	385	-	40	-
Miscellaneous	310	92	148	10	60

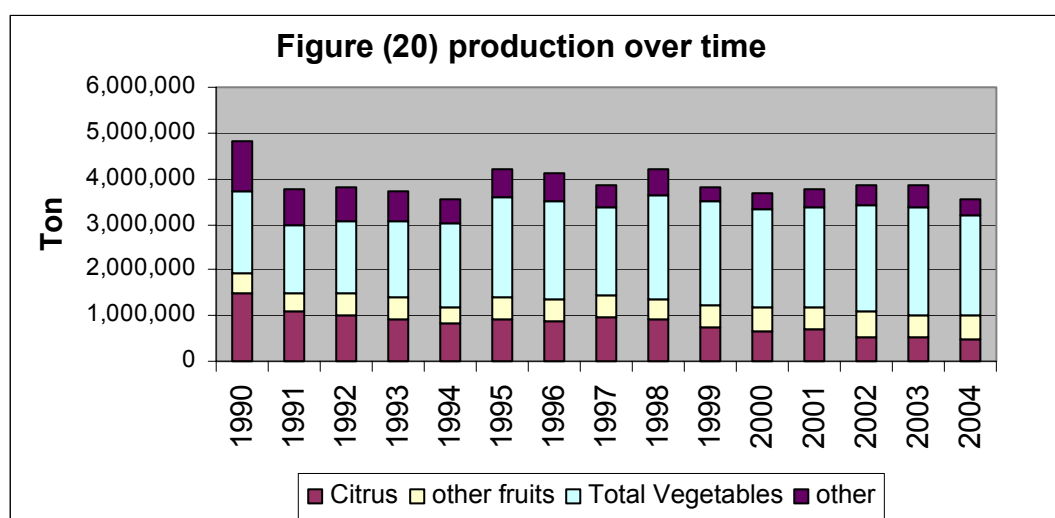
Table 26: Share of local consumption (household plus industry) 2002, 2003, and changes in total production between 2002 and 2003.

	Share of local consumption 2002	Share of local consumption 2003	Changes in production between 2002 and 2003
GRAND TOTAL			2.6%
CROPS - TOTAL	59%	59%	4.2%
Field crops	33%	38%	9.8%
Vegetables, potatoes and melons	81%	78%	11.9%
Citrus	52%	55%	9.0%
Plantations, excl. citrus	71%	70%	-3.7%
Flowers and garden plants	22%	22%	-1.5%
Miscellaneous crops	5%	6%	-4.9%
Poultry	80%	82%	0.4%
Cattle	99%	98%	2.5%
Sheep and goats	98%	98%	-1.0%
Fish	94%	91%	-4.9%
Miscellaneous	74%	77%	-8.0%

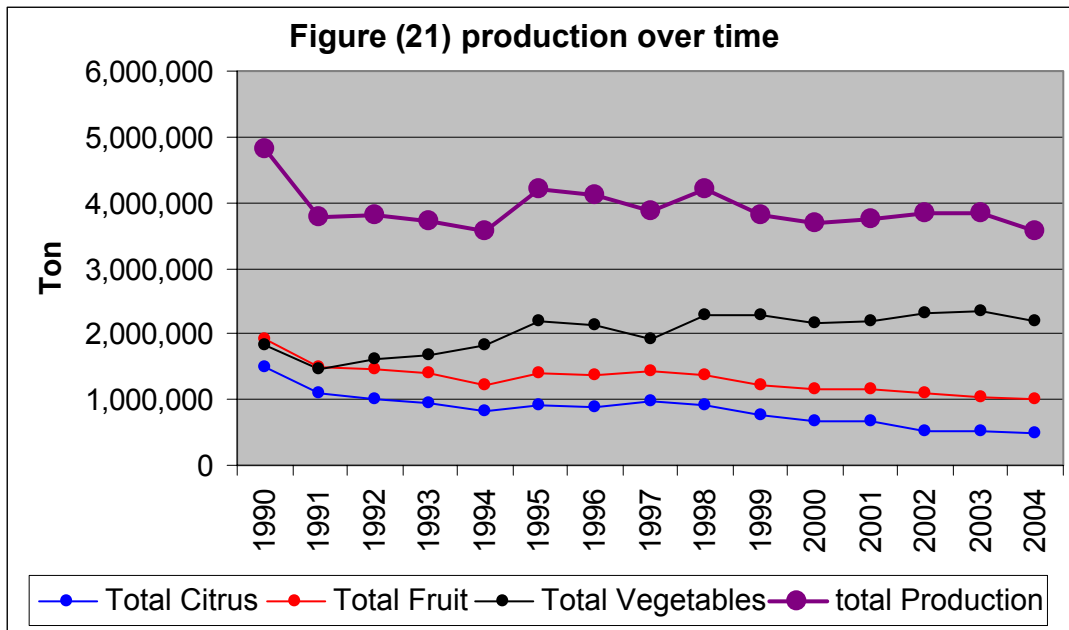
Source for Tables 25 and 26: Statistical Abstract of Israel 2004 No 55, Table 19.16

C. Trends in major crops production

Time series of major crops production in Israel from 1990 until 2004 are presented in figures 20 and 21.



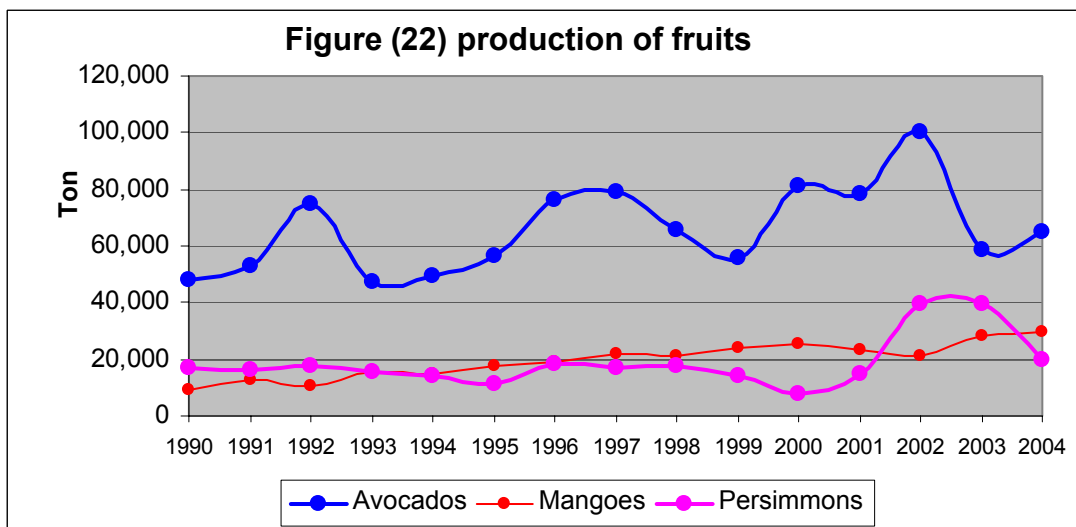
Source: FAO.



Source: FAO.

The cumulative production of fruit declined over time. The decline of citrus production dragged down the production of the entire fruit industry. Orange production dropped from 871,150 tons in 1990 to 145,000 tons in 2004 -- a decline of almost 85% . Production of fruits excluding citrus actually recovered between 2002 and 2004. There is an increase in the share of fruit exported. Vegetables' production is steadily increasing faster than other product category causing its share to increase.

Figure 22 depicts the production of avocados, mangoes and persimmons during the period 1990 – 2004. Production of the avocados and persimmons alternate between abundance years with 40,000 tons of avocados, and shortage years. The difference between high and low production years is about 50% (20000-22000 tons). Persimmons production reveals similar cyclical behavior.



Source: FAO.

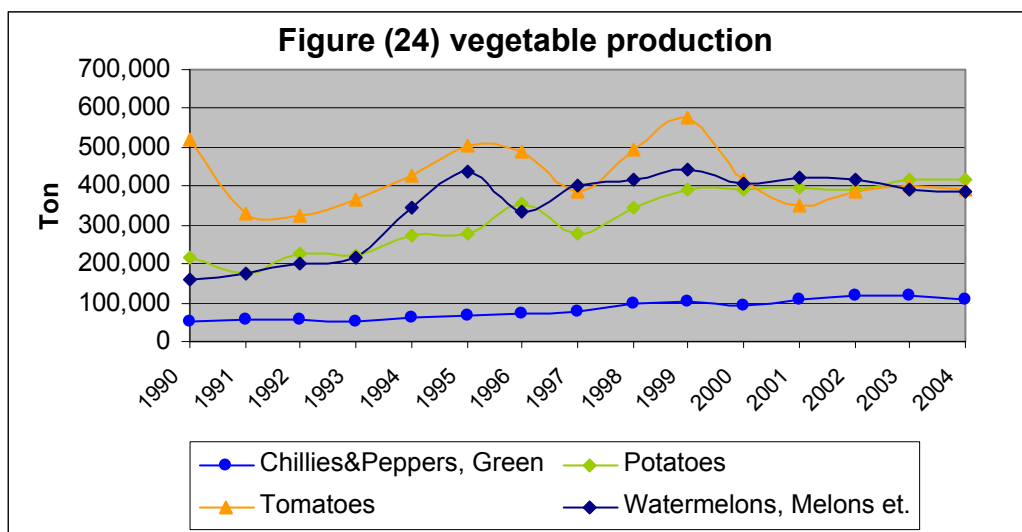
The cyclical production distracts the marketing efforts aimed at increasing the demand. Suppose that the marketer succeeded in establishing a demand for the fruit. In the following year the drop in the supply causes excess of demand, but since the preferences are not anchored, buyers would switch to more familiar and stable alternatives. Retailers hate unstable patterns of purchases and will not allocate space for the problematic produce, unless compensated. In 2003 finally R&D efforts by researchers in the Volcani Instituted found lead to a sharp decrease in the cyclical output pattern of Avocados.

The production of vegetable is affected by overseas demand. The Israeli tomatoes became a success story after the development of the “Daniela” variety in 1970. This success was hard to repeated; new varieties, such as clustered cherries tomatoes, did not compensated for the aging of the “Daniela”. The failure to find a successor to Daniela negatively affected the production and profit margins of the vegetables industry. On the other hand, the profits of the seed R&D companies “Hazera” and “Zraim Gadera” soared.

There was a hope that Bell papers, particularly the Maccabi variety, and Chilies will turn out to be big winners of Israeli's vegetable export. In actual practice the competition, in particular from Morocco and Turkey, eroded the marketing edge of these products. New post-harvest technologies, and the ability to address the demand of the retailing chains retained some of the competitive advantage of chilies and bell paper (three-color).

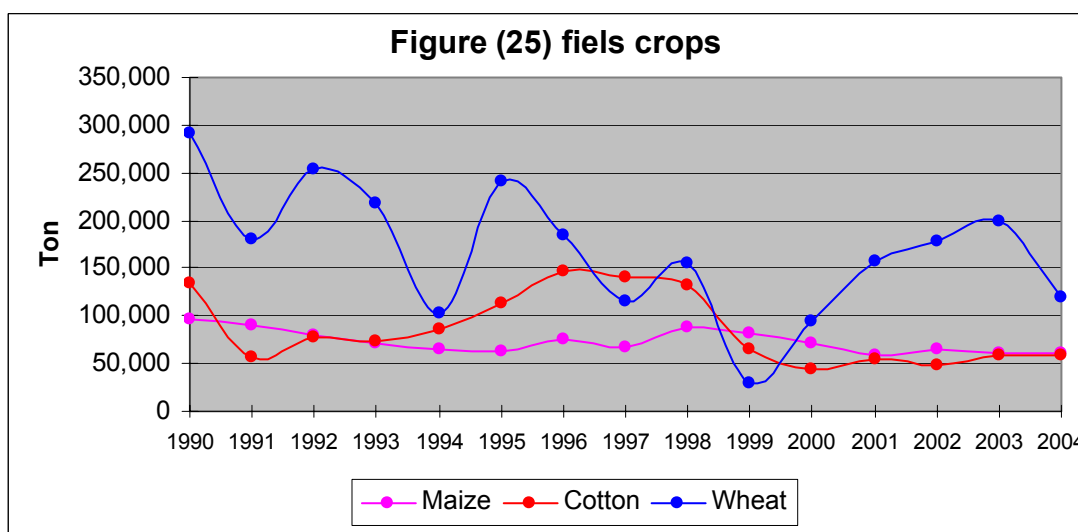
The production of potatoes and melons increased over time, but for different reasons. Potatoes became the “shining star” of the vegetable industry. Potatoes are grown in the Negev where land is abundant and its alternative price is low, and o not require much water. The Negev's desert climate enables out of season production. The new potatoes varieties are of high demand in Europe – particularly France and the UK. Most importantly, the previously uncultivated areas in the Negev allow for organic production. .The combination of new varieties, modest consumption of water, technology oriented production, virgin land suitable for organic products, and favorable climatic conditions support a successful crop.

In 1970 a new melon variety, called Galia, turned out to be a success story , due to long shelf life, which permits surface transportation, and sweeter taste relative to the the Honey Dew -- the competitor melon form South America. Over the years, similar and improved varieties of the Galia were successfully adapted in Spain, Morocco and other countries and the resulting competition lowered its price and eroded its marketing and taste edges. In addition, the interior color of the Galia melon is green and it is fairly small. French buyers (the preferred market for high quality crops) were reluctant to accept a melon that looks like an apple and preferred the Sharente variety. Alas, all the efforts to acclimatize the Sharente in the ARAVE failed.



Source: FAO.

Production of maize, cotton and wheat, is decreasing. Wheat production fell from 300,000 tons in 1990 to less than 120,000 tons. Cotton fell from 140,000 tons in 1990 to just slightly above 50,000 tons in 2004, and maize production declined from 100,000 tons to 50,000 tons in 2004. Raising water prices and shrinking water quotas are the main reason for the sharp drop in the production of these crops.



Source: FAO.

D. Trade by Destination

Import and export of agriculture fresh products

The import of agricultural fresh produce is smaller than the export of fruits and vegetables. The trade surplus is partly due to regulation and custom barriers aimed at protecting domestic growers. Import licenses of fruits and vegetables are issued only if there is a

natural disaster that reduces production drastically, or due to bilateral (or multilateral) agreements.

Table 26: Imports o Selected Fresh Agriculture Products

	2001	2002	2003
Apples	4,600	4,200	3,120
Pears	4,500	2,080	1,890
Grapes	170	430	360
Quinces	450	520	270
Onion	5,860	590	3,400
Chick peas	2,740	3,630	3,020
Garlic	1,380	1,420	2,050
Potatoes	20,220	5,720	4,110
Tomatoes	600	1,550	80
Almonds	3,210	3,320	3,270
Pistachios	4,560	3,300	3,830
Walnuts	5,100	2,890	3,700

Source: FAO

Export of fresh vegetable, potatoes, persimmon, mangoes and flowers, is increasing. Export of citrus and watermelons declines and may diminish in the not-so-far future.

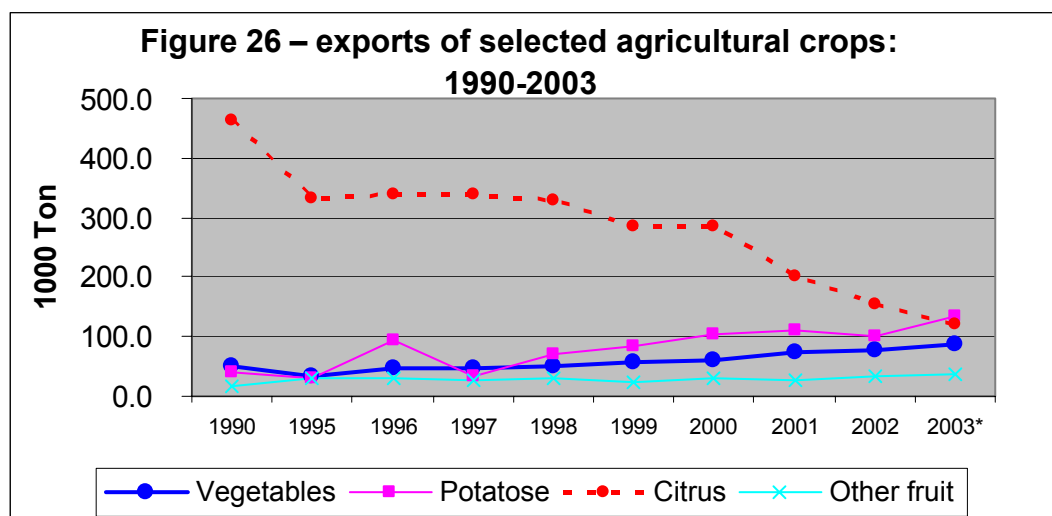
Table 27: EXPORTS OF SELECTED PRODUCTS

Thousand tons, unless otherwise stated							
Year ⁸	Vegetables	Potatoes	melons & watermelon	Citrus	Avocado	Persimmons and mangos	Flowers (\$million)
1990	50.6	41.1	12.4	461.9	35.2	17.7	178.7
1995	33.0	30.4	17.5	333.4	38.8	31.2	193.5
1996	47.1	93.0	24.0	338.6	54.4	29.0	196.6
1997	46.9	33.2	20.7	338.6	46.6	27.7	198.1
1998	49.0	71.1	18.8	330.4	32.4	29.7	224.4
1999	56.7	85.0	18.0	284.2	25.5	22.4	220.7
2000	61.7	105.1	18.8	283.8	29.8	28.9	140.0
2001	75.3	112.1	14.2	201.7	37.0	27.5	167.1
2002	76.1	100.1	8.2	153.9	48.7	34.3	202.7
2003	86.6	135.1	9.9	120.0	27.6	37.3	209.3

Source: Statistical Abstract of Israel 2004 No 55, Table 19.19

⁸ Year of export does not necessarily comply with the year of production.

Figure 26 illustrates the exports of the selected agricultural crops



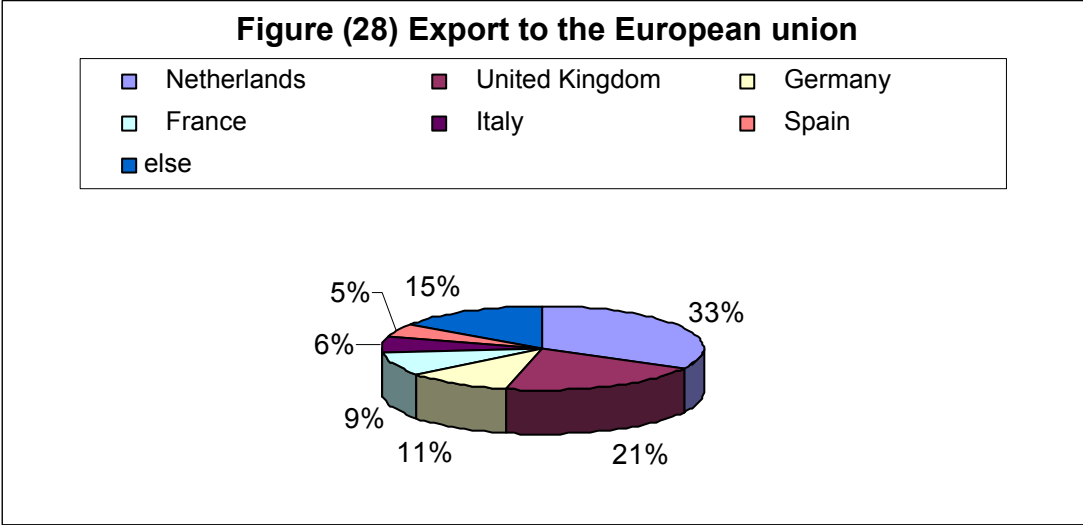
Source: Statistical Abstract of Israel 2004 No 55, table 19.18

Table 28- Export from Israel of selected agriculture products by the destination country in Europe

Total & agriculture Exports by main country of destination in Million dollars				
Country of destination	Grand total		Agriculture	
	2002	2003	2002	2003
GRAND TOTAL	29,347.2	31,783.3	620.4	714.7
European Union - total	7,296.7	8,419.1	483.5	543.8
Netherlands	909.1	1,085.1	162.8	189.3
United Kingdom	1,164.5	1,224.5	104.7	118.5
Germany	1,026.5	1,123.3	50.7	61.8
France	649.0	684.6	51.1	52.0
Italy	693.7	772.5	32.3	34.3
Spain	399.7	525.4	23.6	28.9
Belgium and Luxembourg	1,866.7	2,325.2	19.8	18.1
Free Trade Association -	434.9	557.1	11.7	14.8
Denmark	64.0	72.2	10.0	11.4
Switzerland	384.6	504.9	6.8	8.0
Greece	156.9	222.4	5.1	7.9
Sweden	104.8	91.5	8.6	7.9
Norway	46.5	46.4	4.9	6.8
Finland	83.3	89.1	7.6	5.8
Austria	74.3	68.3	4.5	5.4
Portugal	43.5	49.5	2.3	1.9
Ireland	60.7	85.5	0.4	0.6
Iceland	3.8	5.8	0	0

Source: Statistical Abstract of Israel 2004 No 55, Table 16.6

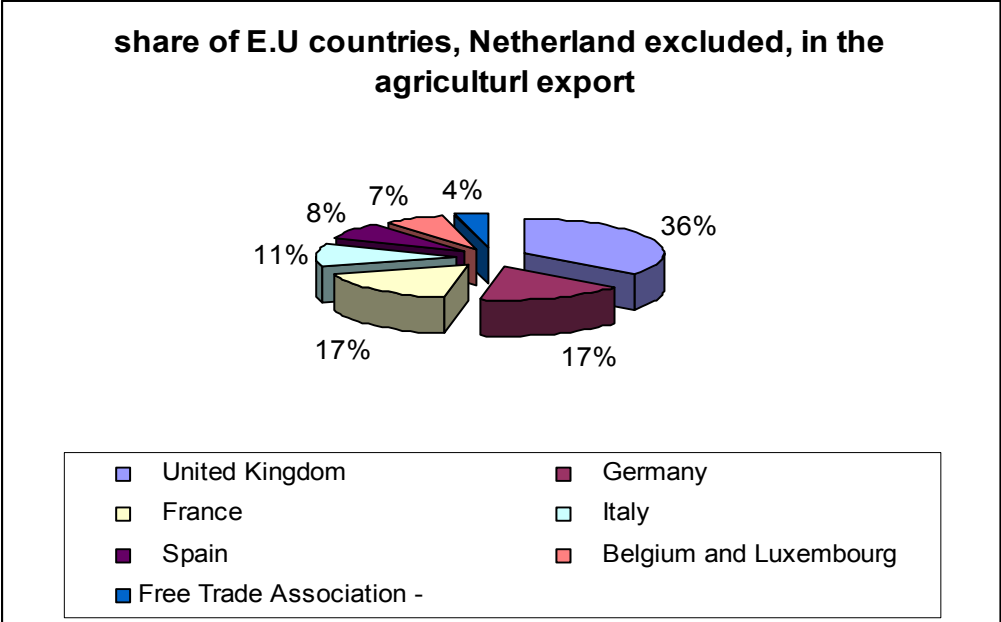
Agricultural export is 2.2% from the total export in Israel. More than 3/4 of it goes to EU members.



Source: Statistical Abstract of Israel 2004 No 55.

After the Netherlands, which receives most of Israel's flowers export, the UK is the main recipient of Israel's fruits and vegetables (36%), followed by Germany, and France (17% each). France was the largest recipient of Israel's agricultural export in the 1970s and 1980s, but marketing mistakes, growing competition with North Africa and non-conducive political environment reduced the demand for Israel's produce in France (France is still the single largest buyer of Israel's avocados, consuming 60% of it).

Figure 29 - Share of Export to E.U. countries excluding Holland



Source: Statistical Abstract of Israel 2004 No 55.

Table 29 - Total & agriculture Exports by main country of destination in Million dollars

Country of destination	Grand total		Agriculture	
	2002	2003	2002	2003
GRAND TOTAL	29,347.2	31,783.3	620.4	714.7
USA	11,712.2	12,088.5	49.3	67.9
Russian Federation	210.5	220.5	14.7	21.8
Turkey	383.1	470.3	12.8	13.8
Japan	649.8	626.0	11.7	9.1
People's Republic of China	426.6	612.6	2.2	5.5
Singapore	272.9	294.0	4.0	3.6
Poland	87.9	94.9	3.2	3.0
Canada	297.0	326.5	1.4	3.0
Brazil	322.3	364.1	6.4	2.6
Australia	267.7	279.1	1.3	2.2
Hong Kong	1,373.2	1,495.4	2.5	2.2
Cyprus	191.4	215.6	1.0	1.5
Unclassified countries	1,466.8	1,527.8	0.2	0.4
Egypt	26.2	26.4	0.8	0
Other countries	1,996.7	2,036.4	2.3	6.6

Statistical Abstract of Israel 2004 No 55.

The US and the Russian Federation are the two important markets after Europe. American consumers have high willingness to pay for quality, but the transportation cost is more than three times that of exporting to Europe. The decreasing European demand for Israel's produce made the U.S a favorable trading partner. The growing Russian economy is becoming an important outlet for Israel's agricultural produce. The Russian market is not yet developed enough to have the ability to pay for high quality, but it welcomes lower price produce, thus complements the EU market.

E. Value added and Income of the agricultural sector

Table 30: Income, profit and salary of the agricultural sector (million NIS)

	1999	2000	2001	2002
Total agriculture production	14.5	14.6	15.5	15.3
Thereof: produce	8	8.2	8.9	9.1
Livestock	6.5	6.4	6.5	6.1
Purchased Inputs	7.8	8.2	8.2	8.2
Value added	6.8	6.4	7.3	7.1
Depreciation	1.3	1.3	1.4	1.4
Net value added	5.4	5.1	5.3	5.7
Compensation for nature damage	0.37	0.4	0.4	0.5
Income	5.8	5.5	6.3	6.2
Income after payment for hired worker	3.5	3.6	3.6	3.6
Income of farmer from agriculture	2.3	1.9	2.7	2.6
Income of farmer relative to the average salary	%60	%51	%63	%63

Source: <http://courses.agri.huji.ac.il/71040/>

Part 3 - Marketing system of fruit and vegetables

A. Organizations

Until 2004 the agricultural production and marketing have been regulated by 10 production and marketing boards: 3 boards administrated the marketing of poultry, milk and honey, and 7 administrated the marketing of fruits, vegetables, citrus, flower and ornaments, wine and grapes, peanuts and olives. The boards were established based on the perception that a situation in which many growers of undifferentiated products face a few buyers leads to unfair outcome. To be specific, most fruits and vegetables sensitive to climate changes, are non storable, and their quality can not be fully monitored. Production flexibility is limited (growers plant before demand and supply are realized). Institutional buyers have a bargaining power over suppliers, and export marketing entails economies of scale. Such circumstances lead to failure of branding (Heiman and Goldschmidt, 2004) and weaken the bargaining power of growers relative to retailers. The marketing and production boards aim is to balance out this uneven state of affairs between growers and distributors (wholesalers and retailers). Israel's antitrust law exempts some agricultural products, including vegetables, fruits, eggs, meat, honey, sheep, milk and aquaculture (fish). The exemption applies to growers, growers cooperatives and organizations, as well as to agricultural wholesalers. The Minister of Agriculture may recommend exemption of other crops to the antitrust commission.

The production and marketing boards controlled long run and short run activities. It used to be illegal to plant perennial (trees) crops without a permit. A similar principle was implemented in the production of meat, fish, poultry and eggs. The production boards, and the long term planning and forecasting division of the Ministry of Agriculture determined the quantities of livestock. These quantizes were then allocated to the farmers according to known priorities (historical permits).

Short term stability was achieved by controlling quantities produced via a monopolistic mechanism. Crop surpluses were destroyed to prevent price falling below certain levels – an act that, in the face of public protests, was termed “surplus clearance”.

The government backed up this policy to guaranteed minimum prices for most fruits and vegetables, but recently the policy has changed and no such guaranteed ere given. As a result, prices fluctuate between years of excess supply and years of shortage.

In the mid 1980s, the fruits' production board decided to waive its power to set production quotas, liberalizing fruit crop production. At first, the growers' boards lost their authority to determine export quotas and latter they lost power to set production quota. Today horticultural growers' boards only certify wholesalers, while production and marketing remain centralized in the poultry, eggs and milk industries. In 2004, the Minister of Agriculture consolidated the four marketing boards of fruits, vegetables, citrus and flower into one board, called horticulture board.

Production and marketing boards and other growers' associations finance their operation by charging framers about 4.5% of their revenue. This mandatory fee is is designated for R&D of new products, professional magazines, and public relation activities. The levy is based on the "packing list" -- the Israeli law prohibits selling, transporting or any other transaction that involves shipping produce from the field without an official packing list issued by a certified wholesaler. Recall that the authority to certify a wholesaler is an exclusive privilege of growers and marketing boards. Special inspection units check vehicles carrying agricultural produce to verify that they carry a valid packing list. The certification and packing lists system assure that growers pay their levies to the production and marketing boards. However, the high fees has led to illegal marketing, bypassing the certified wholesalers – for horticulture crops it is estimated that about 35% of the produce is marketed through alternative channels.

Except for milk and eggs, all production boards lost their power. Large agricultural exporters are still exempted from the anti trust law.

There 6 large agribusiness firms: Agrexco, Arava Growers, Mehadrin, Tnuport, Diklaim and Mor. Agrexco is a not-for-profit agribusiness giant whose owners are the government of Israel (50%) and the growers (50%). It is the largest single exporter, handling some 70% of Israel's horticulture export. Agrexco developed its own brand "Carmel", which became as strong (stronger according to Agrexco) than "Jaffa".

Arava Growers is a cooperative of farmers located in the Arava Valley (that stretches between the Dead Sea and the Red Sea). Most of the melons, bell paper and cherry tomatoes are grown in the Arava. The Arava growers established their own exporting cooperative to save on Agrexco's high transactions costs. Arava Growers handles about 5% of the Israeli horticulture export.

Mehadrin is a large agribusiness firm whose income is derived mainly from real estate acquired long time ago. Using non-negligible political wit, Mehadrin succeeded to change citrus orchards, designated as agricultural land, into urban land. Mehadrin and Tnuport -- a subsidiary of Tnuva -- collaborate in exporting agricultural produce and dominate citrus export to the UK and Scandinavia. They developed their own brand "Top" and sell citrus branded as Top or as "Jaffa".

Diklaim Co. is a cooperative of dates growers in the Jordan Valley and exports some 50%-60% of the Israel's dates. Mor is the largest exporter of persimmons and mangos.

The perception that deregulating agricultural production and marketing by abolishing or weakening the production and marketing boards will improve the competitiveness of Israel's growers has not been proven right. The balance of power has twisted from the growers to the large retailing chains, which account to about 70% of the fresh produce sales. Large retailing chains own their own logistic centers and packinghouses (e.g., Katif packinghouse is owned by the Supersal, the largest supermarket chain in Israel). Katif signed contracts with growers, obliging them to sell to the chain but at a price that will be determined after the realization of supply and demand. This is an example of vertical integration that undermines the grower's position. The large retailing chains (or their packinghouses) purchase 95% of the fresh produce directly from growers and only 5% from wholesalers.

The exporters, and in particular the large exporter employ a similar quasi consignment tactic. Based on their estimation of the production, they sign contract with European supermarket chains and importers. These contracts may specify quantities but not the price, quantities and minimum price, or quantities and price. The contract determines the marketing margin of the supermarket, slotting fees, and shared marketing activities. Exporters consignees the produce and growers are paid the difference between wholesale price and the marketing cost of the exporter. The later is a matter of constant arguments between growers and exporters.

Table 31- Different patterns of distribution

Initiator	First stage	Second stage	Third stage	Fourth stage
Growers	cooperative owned packinghouses	wholesalers	open markets	
Growers	cooperative owned packinghouses	wholesalers	green grocers	
Growers	private packinghouses	wholesalers	open markets	
Growers	private packinghouses	wholesalers	green grocers	
Growers	Retailers owned packinghouse	logistic centers	supermarkets	
Growers	packinghouses	exporter	Importer	Retailing chains
Growers	packinghouses	exporter	Importer	wholesale market
Growers	packinghouses	exporter	Retailing chains	
Retailers	growing contract with farmers	Private owned packinghouses	logistic centers	supermarkets

Source: Cohen (1999).

Most distribution and marketing channels begin at the grower level. Growers choose their product line (long term decision), and quantities (short term decision) based on the previous year's output and performances, recommendation received from the governmental consulting and training services (SHAHAM), and information from other sources (e.g., professional grower magazines). The fruits and vegetables are shipped after harvest to packinghouses, which can be owned by a private entity or by a cooperative of growers. The packinghouses sort and classify fruits and vegetables according to predetermined quality standards and the products are directed based on their quality standard to export (highest quality), domestic (medium low quality) and industry (lowest quality). There are sub-classifications of quality standards and the products are directed to different destinations according to buyers desired quality standards. The export quality standards are crucial to set prices. In Israel the minimum standard is set by the (governmental) Authority of Horticultural Protection ('Rasut Le-Haganat Hatzomech'). Quality standards of many product categories were set after lengthy negotiations between growers' organizations and the Authority for Horticultural Protection. In many cases the quality standards do not correspond to market needs but result from growers' short term interests. The Authority of Horticultural Protection, whose role is to serve as public and farmers' watchdog, sought only survival, i.e., minimizing conflicts. The inappropriate low quality standards undoubtedly contributed to the decline of Israel's agricultural export.

Take for example grapefruits' quality standards and the disappearance of Israeli grapefruits from the British market. Grapefruits standards pertain to the acidity ratio (acid over sugar). The standard was set to 5.5 in the beginning of the season (October, November, December), 6 for the following 2 months (January and February) and 6.5 in March. The competitors, Florida citrus growers in this case, set a standard of 6.5-7 all year around. Market surveys showed that buyers are not satisfied with acid ratio lower than 6.5. The Authority of

Horticulture Protection, nonetheless, maintained the pre-assigned low standards, yielding to pressure from growers of the northern Galilee region whose grapefruits are more sour than grapefruits grown in the central and southern regions of Israel,. This unfortunate policy led to a loss of market shares and deteriorated the once famous and successful brand name 'Jaffa'.

Vertical integration of the two stages of the distribution channel leads to higher quality standards. For example, Mor is an exporter who owns a packinghouse and handles its own plantation of persimmons. Mor's persimmons are sold in higher prices relative to Agrexco's who does not own plantations and packinghouses. The quality of products and thus their marketing destination is affected by the expected prices in each of the target markets. If growers expect high quality price that is too low to justify cost needed to meet the high quality standards, they will produce in a domestic or industry standards. Some of these decision are not easily reversed.

Most of the growers and packinghouses are too small to export directly their own products and use trading companies for export. Table 31 provides a list of the larger Israeli exporters of produce and their specialization.

Table 32 – Largest exports of horticultural products (descending order)

Exporter	Products	Export Market Share
Agrexco	Full product line of crops, processed food, and flowers and breeding	70%
Medadrin-Tnuport	citrus, mango, avocado	
Arava growers	vegetables, flower, herbs	
Diklaim	dates	
Eden	Avocado	
Tropigarden	exotic fruits	
Mor	Persimmon and Mango.	

Source: Cohen (1999).

Growers of export crops chose between importers, local trade companies, wholesalers, or large retailers. Traditionally produce were distribution overseas to importers and wholesalers. In the 80s, Agrexco -- the largest Israeli exporter -- began to sell directly to wholesalers, hoping it would give a competitive advantage. Selling directly to large supermarket chains caused large wholesaler to lose their interest in promoting and marketing the Israeli products. When direct sales to retailers became commonplace, removing the above-mentioned competitive advantage, it was too late to restore merchandizing relationship between exporters and wholesalers. The result is that about 70% of the Israeli fresh fruits and vegetables exported is distributed directly to large supermarket chains.

A new and interesting channel of distribution is the so-called reversed channel. The final buyer, the supermarket chain, contracts a grower or a cooperative of growers specifying the variety, the quantity and the quality standard. Both sides reduce uncertainty and flexibility. Contracted growers are more vulnerable the added risk associated with losing flexibility ('Marcs and Spenser' in the UK used this method to contract growers of clustered cherry tomatoes in the Arava region).

In the domestic market the combination of distribution channels is much simpler than in export, as growers and packinghouses are required by law to sell only to wholesalers. Theoretically, growers could choose between selling directly to one of the six wholesale markets and one of 140 authorized wholesalers. Practically, the choice is predetermined by size and only few large cooperatives and growers can sell directly to the wholesale markets. The majority of growers sell their produce to one of the 140 wholesalers and the choice is between Tnuva, which is the largest agribusiness firm in Israel and dominates the dairy and meat market, to one of the independent 139 remaining wholesalers. Tnuva has a monopsonic power in the domestic market. It is estimated that some 60% - 70% of the domestic produce is marketed by Tnuva.

Table 33- Type and number of wholesalers in the domestic market.

Institute	Number
Wholesale markets	6
Wholesalers	139
Tnuva (the largest domestic wholesaler)	1
Delivering wholesalers	10
Specializing fruit and vegetable retailers	4000

Znobar (2000)

B. Marketing margins and mark ups

There is little documented evidence on marketing gaps. The exact figures are debated by the Ministry of Treasury (who oversees the implementation of antitrust policies via the antitrust authority) and the Ministry of Agriculture. The first argues for large gaps as a result of insufficient competition due to protectionist policies of the latter. The Ministry of Agriculture claims in response that the gap is similar to that in Western Europe.

Znobar, (2000) provides information about the gap without specifying the differences between varieties. The wholesaler gap in fresh fruits and vegetables is estimated to be 30% and it is decomposed into 15% wholesaler commission, 7% depreciation, inaccurate reporting and loading, 4% unloading and palettes fees, and 4% production board levy. The retailer's margin is estimated (op. cit. p. 45) at 33%, setting the total marketing gap at 53%. Thus, if the grower receives 100 NIS per ton, the retailer buys it at 143 NIS and the consumer pays 212 NIS. Such a marketing gap is higher than that in France and Germany (35%) or the UK (44%). In a different report (Simer Consultants, 1989) the retailing margin was estimated at 35%. The vegetables marketing and growers' board in its last report before the consolidation with the fruits and the flowers boards provided detailed information on prices and marketing gaps of a number of vegetables. These calculations are provided below for the six crops.

Watermelons							
	Units	1998	1999	2000	2001	2002	2003
Total domestic marketing	Tons	163,655	179,847	181,875	159,189	158,222	155,644
Average Wholesale price	NIS	1.19	0.99	1.25	1.26	1.23	1.32
Average Retail price	NIS	2.33	1.95	2.11	2.16	2.00	2.32
Marketing margins	%	107%	114%	100%	110%	87%	92%
Total area	Thousand Dunams	165.80	142.30	133.50	133.90	155.30	

Dry onions							
	Units	1998	1999	2000	2001	2002	2003
Total domestic marketing	Tons	70,662	74,117	76,464	76,543	89,596	86,723
Average Wholesale price	NIS	1.58	1.20	1.00	1.58	1.04	1.70
Average Retail price	NIS	3.05	2.75	2.45	3.24	2.68	3.00
Marketing margins	%	100%	142%	150%	106%	175%	93%
Total area	Thousand Dunams	26.60	31.80	34.10	29.80	32.10	

Cucumbers							
	Units	1998	1999	2000	2001	2002	2003
Total domestic marketing	Tons	92,724	90,193	87,258	92,026	103,316	110,455
Average Wholesale price	NIS	1.77	1.88	1.95	2.05	2.21	1.95
Average Retail price	NIS	3.89	3.75	3.79	3.90	4.06	3.59
Marketing margins	%	132%	111%	104%	100%	92%	98%
Total area	Thousand Dunams	17.60	18.50	19.10	18.70	18.40	

Tomatoes							
	Units	1998	1999	2000	2001	2002	2003
Total domestic marketing	Tons	150,275	148,807	151,438	157,852	162,556	170,152
Average Wholesale price	NIS	2.82	2.03	1.81	2.16	2.17	1.88
Average Retail price	NIS	4.45	3.74	3.75	4.15	4.07	3.50
Marketing margins	%	67%	91%	111%	97%	100%	91%
Total area	Thousand Dunams	50.00	55.60	49.30	41.80	43.60	

Potatoes							
	Units	1998	1999	2000	2001	2002	2003
Total domestic marketing	Tons	207,864	211,901	212,354	218,871	216,687	210,657
Average Wholesale price	NIS	1.56	1.63	1.58	1.79	1.59	1.84
Average Retail price	NIS	3.16	3.11	3.09	3.40	3.26	3.33
Marketing margins	%	110%	98%	100%	106%	107%	86%
Total area	Thousand Dunams	89.50	106.90	112.90	114.70	127.40	

Peppers							
	Units	1998	1999	2000	2001	2002	2003
Total domestic marketing	Tons	63,385	61,595	57,647	61,830	65,838	61,995
Average Wholesale price	NIS	3.17	2.63	3.39	2.46	2.37	2.91
Average Retail price	NIS	5.28	5.42	5.39	4.96	4.89	5.17
Marketing margins	%	68%	111%	63%	105%	108%	84%
Total area	Thousand Dunams	20.30	22.50	21.20	22.80	25.30	

The retailing margins in vegetables are higher than the 33% reported by Znohar (2000) and provide another supporting evidence to the power of retailers.

C. Revenue and profit (loss) for selected vegetables and fruits

Table 34: Revenue and cost comparison, selected crops per Dunam (2004)

	Melon		Bell paper		Potato	
	Gallia at open land	Gallia at tunnel	greenhouse	greenhouse	spring with Edigan disinfecting	fall with Edigan disinfecting
Seedling (month of seeding)	07-09	11-04	04	08	01	09
Growth duration (days)	90	210	330	270	150	120
Yield (Ton per dunam)	4.0	9.0	14.0	8.0	5.0	3.5
Out if it - Export	3.0	5.4	0.0	6.0	0.0	2.8
Domestic	1.0	3.6	14.0	2.0	5.0	0.7
Total Revenue (NIS per dunam)	11,000	32,400	49,000	40,000	9,000	4,900
Export	9,000	21,600	0	33,000	0	3,640
Domestic	2,000	10,800	49,000	7,000	9,000	1,260
Total Expenses (NIS per dunam)	10,641	24,997	39,624	28,388	8,119	4,675
Land preparation & mechanization	653	2,548	2,839	2,559	365	365
Seeds and seedlings	1,260	900	3,500	3,500	648	720
Fertilizing	335	892	1,296	1,620	455	455
Pesticides	1,354	2,343	1,571	1,504	885	803
Water	675	1,500	1,800	2,250	900	675
Hired labor	880	4,000	9,600	4,960	80	80
Picking, classification & packaging	5,192	12,125	17,850	10,630	4,597	1,402
Working capital & miscellaneous	292	690	1,168	1,264	189	176
Energy	0	0	0	100		
Profit before grower's labor and working capital	359	7,403	9,376	11,612	881	225
Profit after deducting grower labor and working capital	67	6,713	8,208	10,348	692	49

Source: Min. of Agriculture and Rural Development the Extension Service unit (Shaham), the Farm Economics and Management Division

Table 35: Avocado (Etinger) Revenue and Cost per Dunam over lifetime of a plantation

years	0	1	2	3	4	5	6	20-7
Total Production (Ton per dunam)	0	0	0	0	0.5	1.5	2	2
Out of it: Export	0	0	0	0	0.35	1.05	1.4	1.4
Domestic	0	0	0	0	0.125	0.375	0.5	0.5
Other	0	0	0	0	0.025	0.075	0.1	0.1
Total Revenue (NIS per dunam)	0	0	0	0	1,044	3,131	4,175	4,175
Form Export	0	0	0	0	730.6	2192	2923	2922.5
Form Domestic	0	0	0	0	260.9	782.8	1044	1043.75
Other	0	0	0	0	52.19	156.6	208.8	208.75
Total Expenses (NIS per dunam)	666	4,379	1,461	2,094	2,742	2,994	3,312	3,312
Seeds and seedlings	400	2,853	0	0	0	0	0	0
Mechanization	0	149	149	149	181	270	496	496
Fertilizer and manure	0	30	60	86	146	146	146	146
Weed extermination	0	8	8	4	4	4	4	4
Pesticides	0	0	0	0	0	0	0	0
Water	0	280	420	1,050	1,260	1,260	1,260	1,260
Hired labor	0	150	75	75	225	375	450	450
constant labor	250	520	520	520	520	520	520	520
Other materials & services	0	100	93	40	203	203	203	203
Management & e.t.	0	60	60	60	60	60	60	60
Working capital & miscellaneous	16	228	76	109	143	156	173	173
Profit before self labor	-416	-3,859	-941	-1,574	-1,178	657	1,383	1,383
Profit after deducting self labor	-666	-4,379	-1,461	-2,094	-1,698	137	863	863

Source: Min. of Agriculture and Rural Development the Extension Service unit (Shaham), the Farm Economics and Management Division

D. Revenue and cost per Dunam

Table 36: Persimmon

years	0	1	2	3	4	5	6	20-7
Total Production (Ton per dunam)	0	0	0	0.4	1	2.5	3	3
For Export	0	0	0	0.24	0.6	1.5	1.8	1.8
For Domestic	0	0	0	0.16	0.4	1	1.2	1.2
Total Revenue (NIS per dunam)	0	0	0	1368	3420	8550	10260	10260
Form Export	0	0	0	821	2,052	5,130	6,156	6,156
Form Domestic	0	0	0	547.2	1368	3420	4104	4104
Total Expenses (NIS per dunam)	512.5	3708.4	1583.5	2730.3	5346.3	8827.8	9931.3	9931.3
Seeds and seedlings	250	2139	0	0	0	0	0	0
Mechanization	0	151	162	195	218	241	287	287
Fertilizer and manure	0	29	73	97	107	107	107	107
Weed extermination	0	66	69	56	57	44	44	44
Pesticides	0	1	2	10	31	42	42	42
Water	0	40	40	565	1,444	3,319	3,944	3,944
Hired labor	0	210	350	560	980	1,260	1,260	1,260
constant labor	0	60	60	60	60	60	60	60
Other materials & services	0	300	225	525	1,650	2,775	3,150	3,150
Management & e.t.	250	520	520	520	520	520	520	520
Working capital & miscellaneous	13	193	83	142	279	460	518	518
Profit before self labor	-263	-3,188	-1,064	-842	-1,406	242	849	849
Profit include self labor	-513	-3,708	-1,584	-1,362	-1,926	-278	329	329

Source: Min. of Agriculture and Rural Development the Extension Service unit (Shaham), the Farm Economics and Management Division

E. Consumption of fruits and vegetables

Table 37 : Private consumption expenditure by purpose in NIS million at 2000 PRICES

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Food, beverages and tobacco	49,485	52,090	52,839	52,948	53,383	55,093	56,221	57,142	58,314
Clothing, footwear and personal effects	11,923	12,387	12,188	11,767	12,693	14,076	13,351	13,436	13,984
Housing	46,812	47,812	49,070	51,327	52,921	55,770	57,338	59,389	60,769
Electricity and fuel - home consumption	4,757	5,092	5,401	5,772	5,800	6,411	6,728	7,173	7,366
Furniture, furnishings and household equipment	12,048	13,273	13,907	14,481	16,788	18,607	17,449	16,684	17,090
Household maintenance	7,498	7,637	7,808	8,738	9,085	9,482	9,907	10,010	10,125
Personal care and health	11,378	11,980	12,673	13,656	15,069	16,409	16,446	16,836	17,153
Transport and communications	30,434	31,715	32,431	34,353	36,792	40,578	40,954	39,611	39,289
Recreation and entertainment	21,898	22,547	24,234	25,049	26,397	27,108	23,932	22,812	22,831
Other goods and services	16,443	17,248	17,798	18,235	18,839	19,790	20,598	20,957	21,095

Source Statistical Abstract of Israel 2004 No 55, Table 14.9,

F. Calorie consumption balance 2003

Average per capita calories consumption is 3545 kilocalorie. Average annual per capita supply of food groups is 121 kg of bread and cereals, 245 kg vegetables, 47 kg potatoes and stretches, 71 kg meat and fish, 32 kg sugar and sweets, 236 eggs and 177 liters of milk The calorie supply per capita per day in 2002 was 3714. The supply of food per capita is the product of 107 grams of protein, 484 carbohydrates and 144 gram fat. The proportion of fat from total calorie supply was 20% (697 kcl) and it below the threshold recommendation of 30%.

Table 38: Annual supply per capita of food

	Kg per capita per year
Bread and cereals,	121
Potatoes and stretches	47
Sugar and sweets	32
Beans, legume, Peanut, nut	18
Vegetables	254
Fruits and fruit juices	124
Alcoholic beverages	70 (Liter)
Fat and oil	29
Meat and fish	71
Eggs	236 units
Milk	177(Liter)

Source : Press release no 2004/274 - The central bureau of statistics 14/10/04 Ms. Shafir

G. Dependence in imports factor

$$\text{Import Dependency Ratio IDR} = \frac{\text{Import}}{\text{Export} - (\text{production} + \text{import})} * 100$$

Higher IDR implies higher import dependency.

Table 38A- L IDR

Product group	IDR (%) *
Bread and cereals	99.5
Sugar and sweets	94.8
Fish	78.8
Beans, peanuts, and nuts	61.7
Oil and fat	40.3
Fruits, vegetables and potatoes	26.1
Meat	12.8
Dairy	1.1

Source: Press release no 2004/274 - the central bureau of statistics 14/10/04 Ms. Shafir

99.5% of cereals consumption comes from import, i.e., Israel supplies only 0.5% of its own consumption. Israel also depends heavily on imports of sugar and sweets, as only 5% are produced locally. In addition, 61.7% of the beans, 40.3% of the fats and oils, and 78.8% of the fish are imported. Some 74% of the consumption of fruits, vegetables and potatoes is produced domestically; 77.2% of the meat and 98.9% of dairy products are produced domestically.

H. International comparison

The daily value of calorie consumption in Israel is similar to industrial countries but somewhat higher than other Mediterranean countries. Consumption of vegetable calories is similar to other Mediterranean countries.

Table 39

Selected countries	% of calorie that come from vegetable consumption	Daily Supply of Kcal
U.S.A	72	3774
Greece	78	3721
Israel	81	3714
France	63	3654
Germany	69	3496
Spain	72	3371
Holland	66	3362
Lebanon	83	3196
Jordan	91	2673

Source: Press release no 2004/274 - the central bureau of statistics 14/10/04 Ms. Shafir

Part 4 - Evaluation of Agri Industrial performance

Table 40 - Top 30 import of agriculture products to Israel at 2002 and 1990

Imports	1990			2002			G.R.
	Val (1000\$)	% from Total	% from Top 30	Val (1000\$)	% from Total	% from Top 30	
Wheat	110,624	9.2%	15.0%	191,357	10.1%	13.3%	73.0%
Food Prepared	31,470	2.6%	4.3%	164,322	8.6%	11.4%	422.2%
Soybeans	102,532	8.6%	13.9%	156,256	8.2%	10.8%	52.4%
Beef and Veal, Boneless	643	0.1%	0.1%	114,025	6.0%	7.9%	17633.3%
Cigarettes	39,406	3.3%	5.4%	108,126	5.7%	7.5%	174.4%
Sugar Refined	129,763	10.8%	17.6%	101,892	5.4%	7.1%	-21.5%
Maize	49,611	4.1%	6.7%	101,795	5.3%	7.1%	105.2%
Barley	39,966	3.3%	5.4%	46,616	2.4%	3.2%	16.6%
Crude Organic Materls 29	34,160	2.9%	4.6%	41,111	2.2%	2.8%	20.3%
Chocolate Products nes	12,769	1.1%	1.7%	38,818	2.0%	2.7%	204.0%
Sugar Confectionery	15,773	1.3%	2.1%	34,008	1.8%	2.4%	115.6%
Milled Paddy Rice	20,392	1.7%	2.8%	30,543	1.6%	2.1%	49.8%
Fruit Prepared nes	9,394	0.8%	1.3%	30,287	1.6%	2.1%	222.4%
Flour of Maize	12,135	1.0%	1.6%	23,413	1.2%	1.6%	92.9%
Pastry	3,331	0.3%	0.5%	22,584	1.2%	1.6%	578.0%
Breakfast Cereals	5,012	0.4%	0.7%	20,790	1.1%	1.4%	314.8%
Food Wastes Prep Feed	6,740	0.6%	0.9%	18,848	1.0%	1.3%	179.6%
Sesame Seed	21,736	1.8%	3.0%	18,444	1.0%	1.3%	-15.1%
Coffee Extracts	4,580	0.4%	0.6%	17,662	0.9%	1.2%	285.6%
Coffee, Green	28,476	2.4%	3.9%	17,521	0.9%	1.2%	-38.5%
Pet Food	3,423	0.3%	0.5%	17,380	0.9%	1.2%	407.7%
Beer of Barley	2,366	0.2%	0.3%	16,955	0.9%	1.2%	616.6%
Cattle	147	0.0%	0.0%	15,819	0.8%	1.1%	10661.2%
Beverages Dist Alcoholic	5,474	0.5%	0.7%	15,185	0.8%	1.1%	177.4%
Sugar (Centrifugal, Raw)	8,607	0.7%	1.2%	14,836	0.8%	1.0%	72.4%
Orange juice Concentrated	11,631	1.0%	1.6%	14,400	0.8%	1.0%	23.8%
Tobacco Leaves	23,145	1.9%	3.1%	13,608	0.7%	0.9%	-41.2%
Macaroni	1,845	0.2%	0.3%	12,537	0.7%	0.9%	579.5%
Beverages Non-Alcoholic	1,068	0.1%	0.1%	12,502	0.7%	0.9%	1070.6%
Wine	340	0.0%	0.0%	12,101	0.6%	0.8%	3459.1%
Total Top 30	736,559	61.5%	100.0%	1,443,741	75.9%	100.0%	96.0%
Total	1,196,787	100.0%		1,903,201	100.0%		59.0%

Source: FAO

The major agriculture product imported to Israel is wheat, which is imported mainly from the U.S. The import of wheat increased by 73% between 1990 and 2002. Prepared food is the second largest import item, followed by Soybeans and Beef. Beef is imported mainly from Argentina and sporadically from the U.S.

A. Import and export of fresh and processed food

The volume – both quantity and value – of processed food import has been growing over time, while export of agriculture processed products has been declining. The ratio of import

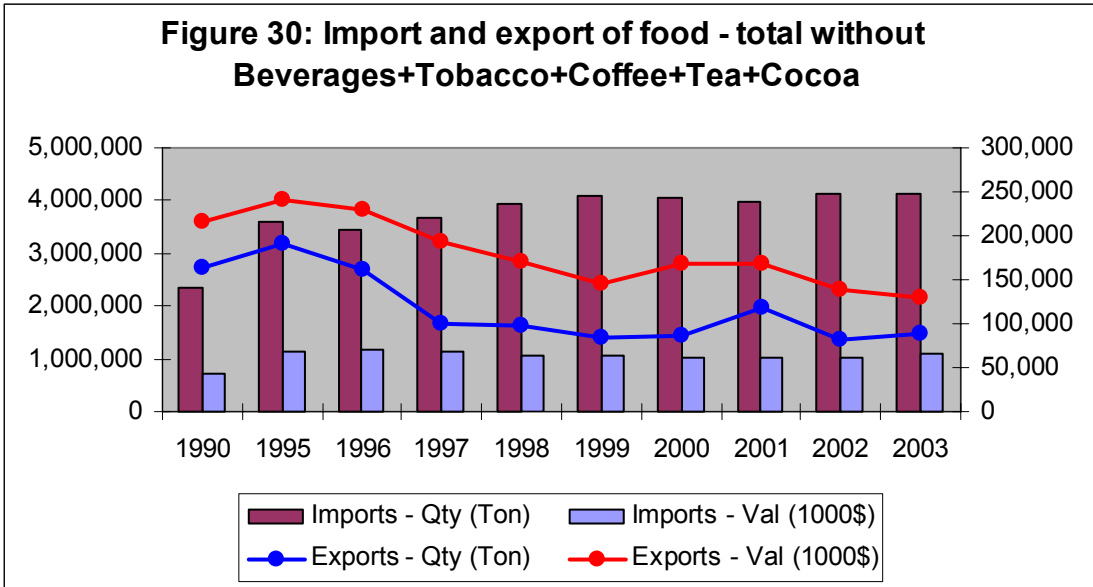
relative to export is over 50 by quantity and over 7 by value. The large difference between the quantity import-to-export ratio and value import-to-export ratio is a result of the high value of exported food products relative to low value imports. This favorable outcome is a result of the specialization and advanced know-how of Israel's agricultural sector. In 1990, the import-to-export ratio was 3.3 and in 12 years this ratio, which reflect the deficit in the balance of trade, has doubled. The agricultural trade deficit increased since the value of import has doubled and the value of export fell by 37%.

Table 41 - Imports and Export: Total without Beverages + Tobacco + Coffee + Tea + Cocoa

Year	1990	1995	2000	2002
Imports - Qty (Ton)	2,364,868	3,581,797	4,045,665	4,146,510
Imports - Val (1000\$)	724,402	1,128,936	1,024,852	1,020,772
Exports - Qty (Ton)	163,369	190,212	87,403	81,703
Exports - Val (1000\$)	216,766	241,841	167,771	138,714

Source: FAO

Figure 30 depicts the changes in import and export measured by quantity and value. The decline in export is larger than import growth.

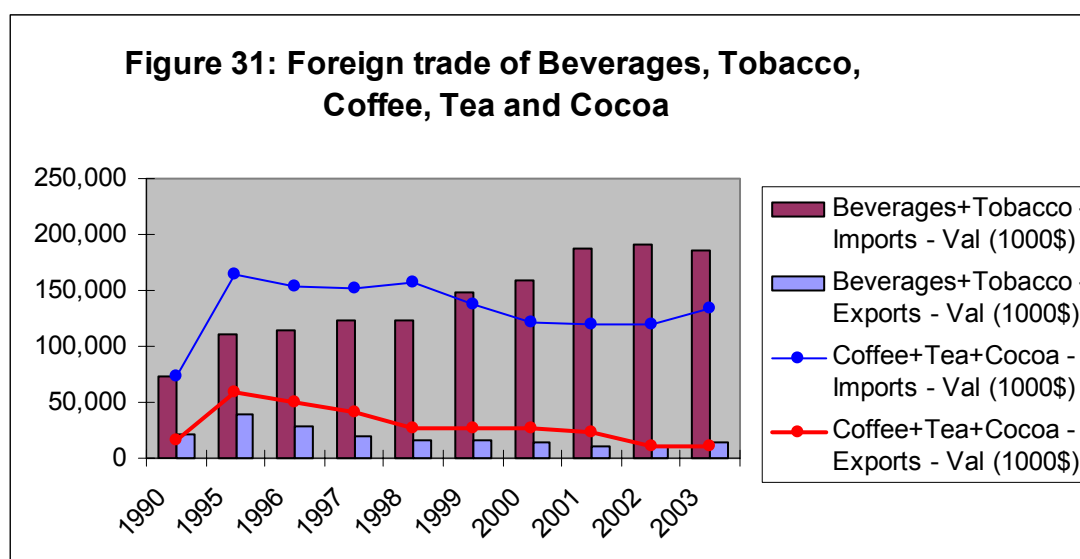


Source: FAO

The deficit in the balance of trade in beverages and tobacco is larger than the deficit of the entire food category. In 1990, Israel imported about \$73 million worth of beverage and tobacco and exported about \$20.5 millions, yielding a deficit of \$52.5. The 1990 import over export ratio was of 3.6. Between 2002 and 1990 the value of import increased by 160% while the value of export decreased by 48%, resulting in import-export ratio of 17.6. The import export ratio in the coffee, tea and cocoa category, which was 4.7 in 1990, increased to 10.3 in 2002.

Table 41 - Foreign trade in the Beverages, Tobacco, and Coffee, Tea and Cocoa categories for years 1990, 1995, 2000 and 2002

Year	1990	1995	2000	2002
Beverages + Tobacco				
Imports - Val (1000\$)	73,250	110,863	159,730	190,858
Exports - Val (1000\$)	20,548	38,644	13,505	10,842
Coffee + Tea + Cocoa				
Imports - Val (1000\$)	73,209	164,618	121,629	118,911
Exports - Val (1000\$)	15,567	58,166	26,958	11,540

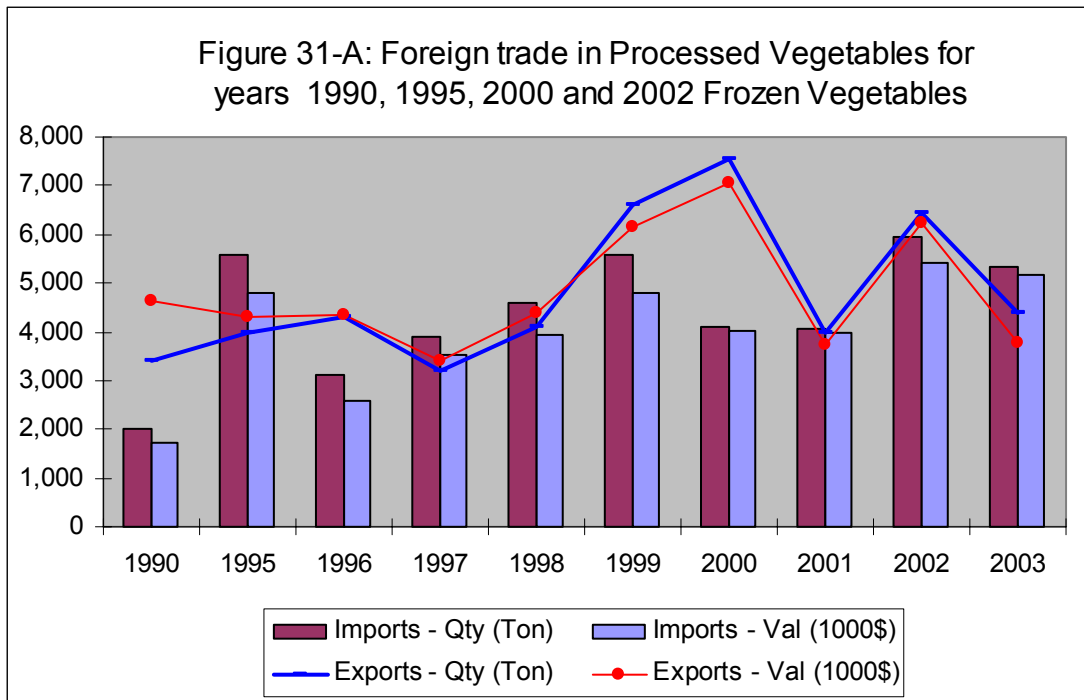


Source: FAO

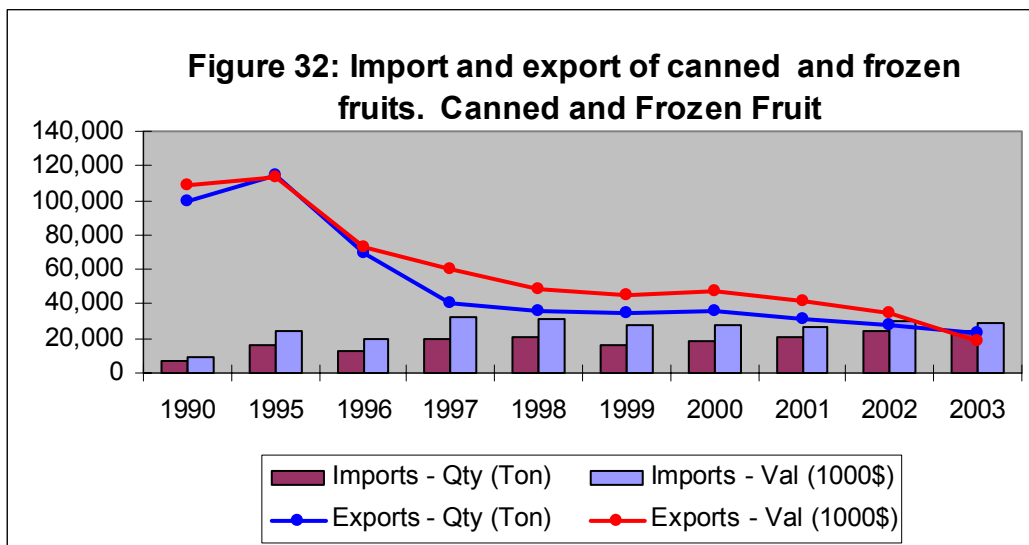
Table 42 - Foreign trade in Processed Vegetables for years 1990, 1995, 2000 and 2002

Dehydrated Vegetables				
Imports - Qty (Ton)	1,280	1,900	2,554	2,358
Imports - Val (1000\$)	4,799	6,733	5,358	5,442
Exports - Qty (Ton)	3,800	5,700	6,195	6,750
Exports - Val (1000\$)	9,242	14,552	15,759	15,784
Frozen Vegetables				
Imports - Qty (Ton)	2,000	5,600	4,116	5,945
Imports - Val (1000\$)	1,726	4,817	4,024	5,402
Exports - Qty (Ton)	3,400	4,000	7,550	6,456
Exports - Val (1000\$)	4,642	4,325	7,061	6,228

Source: FAO



The balance of trade in processed vegetables is positive. In 2002 import export ratio was 0.35 in dehydrated vegetables and 0.95 in frozen vegetables.



There is a large decline in the export of frozen and canned fruits. The import of canned and frozen fruits is almost steady, and therefore, the deficit in the balance of foreign trade in that category increases.

B. Export and Import of Beef and Poultry including shell eggs

The lion share of the beef consumed in Israel is imported. Neto Holding company and Tnuva are the main importers. There is no export of beef. The poultry industry supplies the entire demand and excess production is exported mainly to Russian Federation countries.

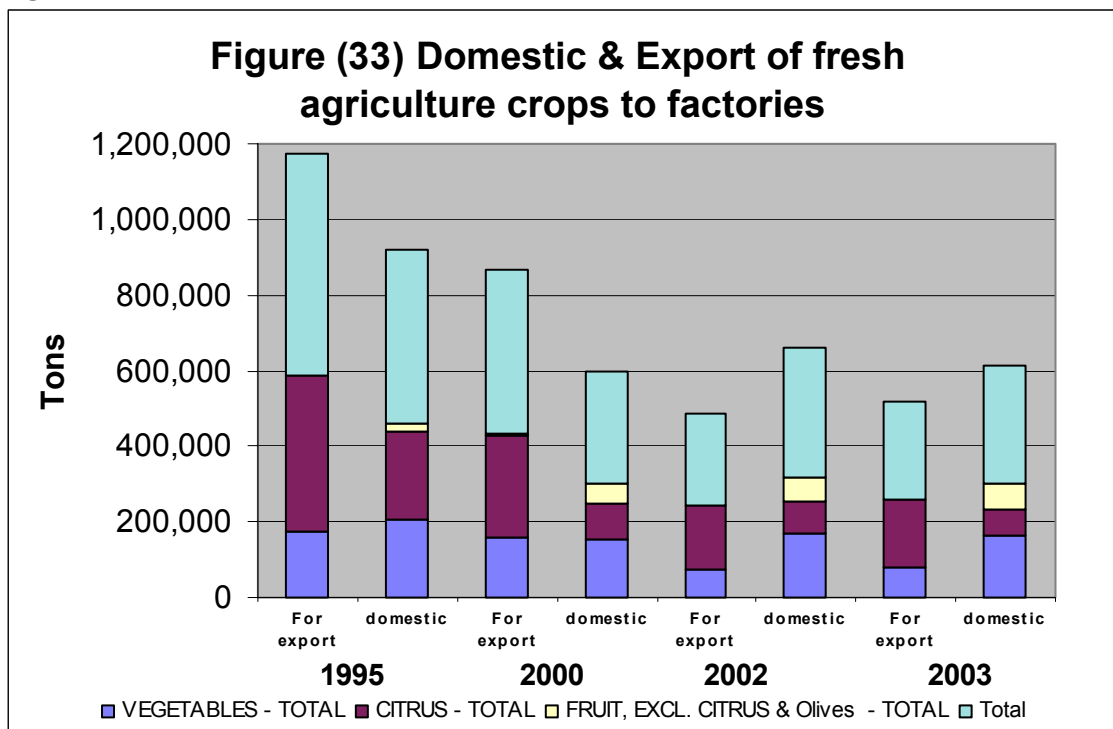
C. Export and Import of dairy products

The dairy industry is highly advanced and a world leader in the production of low fat soft cheese. But even in this industry, Israel's trade balance is not flattering. In 2003, the value of imported cheese to Israel was \$6.4 million while the export was \$2.2 million. This is somewhat disturbing since Tnuva opened a branch in New York, targeting the large kosher market in the U.S. Tara and Strauss operate in the Jewish communities in Western Europe. It is expected that liberalization in the dairy industry will increase exports of Israel's dairy products to these markets.

D. Supply of fresh vegetables and fruit to factories, by use of the processed produce:

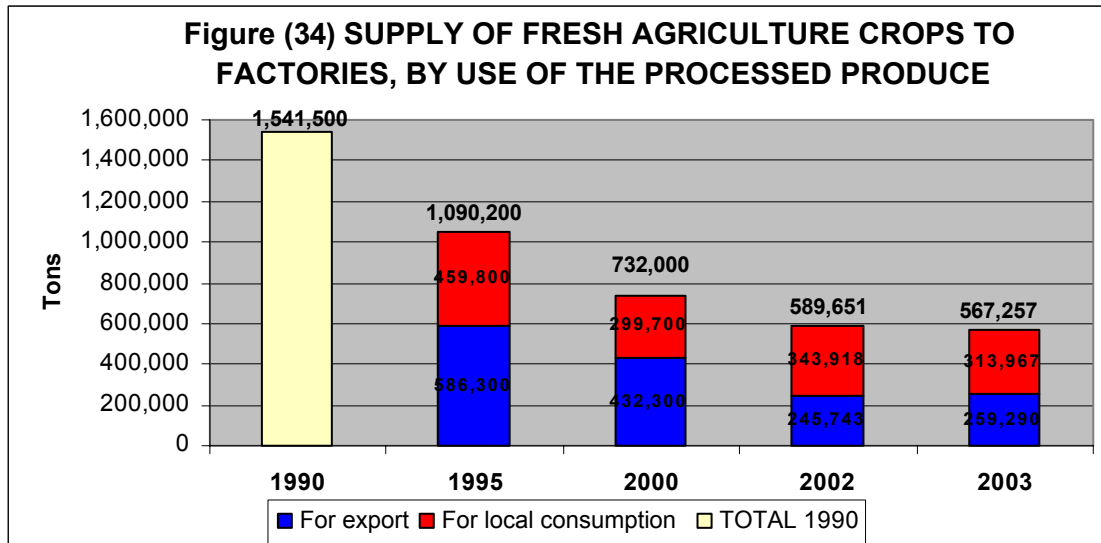
The decreasing supply of fresh vegetables and fruits to industrial processing (juice, comfitures, jam, canned, frozen and dehydrated) is depicted in figures 33 and 34.

Figure 33



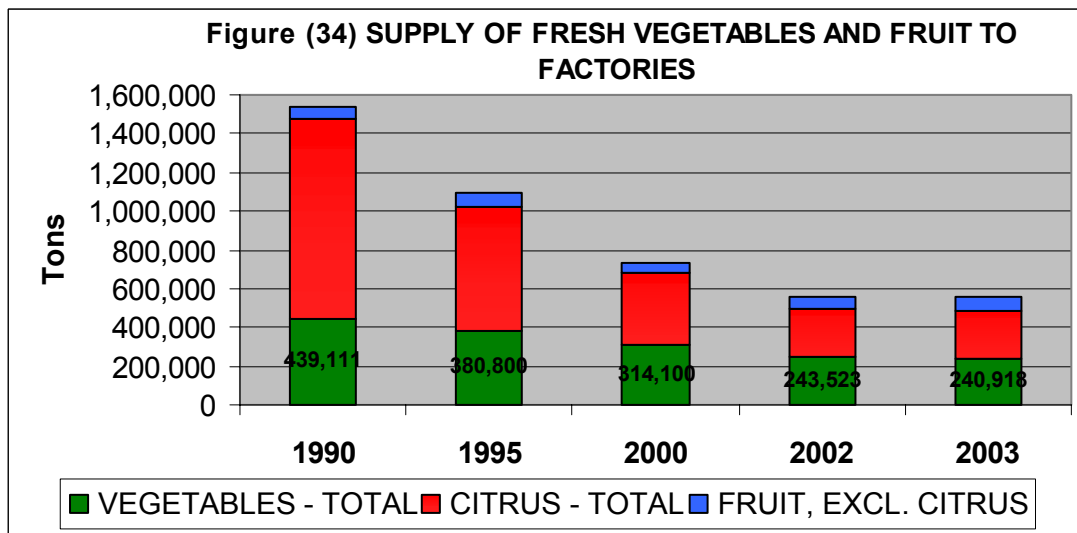
Sources: Statistical Abstract of Israel 2004, 2002, 2000, 1995

Figure 34



Sources: Statistical Abstract of Israel 2004, 2002, 2000, 1995

Figure 35



Sources: Statistical Abstract of Israel 2004, 2002, 2000, 1995

E. Analysis

Until 2000, Israel's GDP per capita grew faster than other OECD countries. During 2001, 2002 and 2003, growth falters due to lower demand worldwide and domestic instability. The economy has recovered nicely during 2004 and 2005 looks promising so far. A consequence of the recession years (2001-2003) is the reduction in food demand. Weaker food industries did not succeed to survived while strong industries recovered and even increased production. Table 43 presents indicators for production and employment, with 1994 is the base year that assumes the value of 100. Total food production increased to 133.4 in 2000 (+33.4%) and has stabilized at 124 in 2003. Processing of fruits, vegetables, fish, meat and poultry, and chocolate and confectionery categories suffered from the recession and their production in 2003 is lower than in 1994. Industries that were negatively affected but their output is higher relative to 2000 are: edible oils, margarine and oil products, and prepared food products. Industries that increased production are: beverages and tobacco products,

grain mill products, bakeries, matzos and pastry products. The dairy products and icecream categories production remain constant over the years.

Table 43: MANUFACTURING PRODUCTION AND EMPLOYEES, BY INDUSTRY (AGGREGATED GROUP) (Indices). Base: 1994 = 100

Manufacturing production									
	1995	1996	1997	1998	1999	2000	2001	2002	2003
GRAND TOTAL	108.4	114.2	116.2	119.5	121.2	133.4	126.2	124.4	124.0
<i>Food products – total</i>	107.1	108.5	110.3	110.4	113.2	113.5	111.6	109.6	106.3
Processing of meat and poultry	111.2	104.4	101.8	105.0	116.0	113.8	102.4	103.1	94.5
Processing of fruit, vegetables and fish	104.4	106.4	104.1	107.6	102.9	100.7	92.3	88.5	93.6
Edible oils, margarine and oil products	117.7	92.4	107.9	106.6	117.4	114.4	113.0	115.0	111.2
Dairy products and ice-cream	103.5	103.4	107.5	111.2	110.4	110.7	112.6	110.0	109.9
Grain mill products	103.2	101.5	103.1	107.3	109.5	109.3	110.3	113.6	116.7
Bakeries, matzos and pastry products	104.8	109.2	107.5	102.5	98.8	101.9	96.3	100.1	101.8
Chocolate and confectionery	125.3	132.7	122.8	116.3	119.0	113.2	113.2	90.9	86.1
Prepared food products	98.9	122.5	125.0	125.5	133.6	154.6	156.5	134.4	114.5
Food products n.e.c.	103.2	114.2	127.5	124.7	133.9	128.6	138.2	145.1	135.8
<i>Total - Beverages and tobacco products</i>	119.6	112.3	123.9	129.5	123.8	123.2	125.3	126.1	127.8
Soft drinks	112.6			144.2	154.5	152.2	157.4	152.2	149.0

Employees									
	1995	1996	1997	1998	1999	2000	2001	2002	2003
GRAND TOTAL	103.8	105.3	104.3	103.3	101.9	103.2	100.3	96.3	93.9
<i>Food products - total</i>	103.6	105.5	105.4	102.3	101.8	101.4	98.6	99.3	98.6
Processing of meat and poultry	106.4	104.7	97.6	102.3	104.5	102.4	98.3	95.4	92.0
Processing of fruit, vegetables and fish	95.6	87.0	81.9	72.8	68.6	62.3	56.8	52.5	53.4
Edible oils, margarine and oil products	98.3	97.7	94.7	95.7	91.7	89.3	89.5	98.0	87.2
Dairy products and ice-cream	114.9	127.6	143.5	148.1	147.6	138.2	143.8	150.1	154.0
Grain mill products	100.8	96.9	94.5	90.2	100.4	113.9	115.9	119.5	123.6
Bakeries, matzos and pastry products	102.6	104.4	103.6	98.8	95.7	96.4	88.8	92.3	91.7
Chocolate and confectionery	101.2	101.9	99.2	86.5	83.2	78.0	83.8	82.1	82.5
Prepared food products	104.0	122.2	120.5	122.6	127.7	153.5	153.4	141.9	139.4
Food products n.e.c.	108.3	117.8	142.0	142.0	141.3	138.1	141.9	143.0	143.7
<i>Total - Beverages and tobacco products</i>	105.1	103.6	103.8	102.8	105.4	108.5	106.8	104.6	103.3
Soft drinks	108.6			100.3	103.0	103.9	101.2	101.5	100.4

Sources: Statistical Abstract of Israel 1995-2004 No46- 55

The number of employees in the food industry declined between 1994 and 2004 by about 6%. The sharpest decline was in the processed fruits, vegetables and fish (-46%) followed by chocolate and confectionery and then edible oils, margarine and oil products (-17.5% and -12.8% respectively). The industries that increased the size of their workforce are dairy products and ice-cream +54%, prepared food products 43.7% and Grain mill products 23.6%. The top three industries that increased their workforce are not necessarily the same industries with the highest growth in production. The dairy and ice cream industry added more that 54% employees but kept its production constant.

Table 44 – food manufacturing and Processing Establishments

	1995	1997	1998	1999	2000	2001
TOTAL	9913	9,810	9364	8,869	8,576	8,096
Food products	1018	1,094	997	988	1,008	976
Beverages and tobacco prod.	No Data	52	53	52	57	59

Sources: Statistical Abstract of Israel 1995-2004 No 46- 55

The indicators for production show a stability between 1994 and 2004 and a decline between 2000 and 2004. The employment indicators show a decline in employment and the number of food producers agrees with these figures and decline from 1019 in 1995 to 976 in 2001. There is a small increase in the number of beverage producers from 51 in 1997 to 58 in 2001.

F. Special Section -Focus on Tnuva the largest dairy producer

Tnuva is the largest Israeli milk and dairy products food processor and one of the leading Israeli firms. Tnuva was established as a cooperative of 620 kibbutzim and moshavim. It buys and processes about 70% of the milk produces in Israel. Tnuva guaranteed buying the milk produced by its members at a predetermined price (termed target price). The target price (a matter of fierce policy debate and will be discussed below) is practically a version of cost plus pricing. In order to assure Tnuva's ability to pay the target price, the government determined the production quotas and guaranteed to cover any deficit. Tnuva produces almost the entire spectrum of dairy product (fresh milk, milk powder, butter, cheese, yogurts). Since it is not a public company, performance data are hard to obtain and or derived mainly from secondary sources.

Its annual net profits increased in 2004 to 210 million NIS (\$ 47.7 million) after four years of stagnation (1999 – 154 million NIS, 2000 – 150 million 2001- 120 million, 2002 – 130 million, and 2003 - 150 million NIS). One of the reasons for Tnuva's improved performance is its successful multi-cooperation with Yoplait, a French yogurt producer. The multinational alliances and their affect on the agro-industrial sector are to be discussed in details in part V. 60% of Tnuva's revenues come from milk and milk products. Tnuva's value has been estimated in April, 2005 at 4-4.5 billion NIS (about \$ 1 billion).

Part 5 - The Food retailing system in Israel

The turnover of food retailing was 37 billion NIS in 2004. The annual growth of food retailing is 2%-2.5% --the same as the population growth rate. The Israeli retailing system is highly competitive with overcapacity of facilities and storage area.

In 2002, about 3500 food retailing companies were active; of which some 13%-15% are owned by the three large supermarket chains: Supesal, Coop (Ribua Kahol) and Club Market (the latter has recently filed for bankruptcy procedures). The three large chains accounted for about 47% of the sales of food and grocery items (Globs, 2002). Specializing chains positioned themselves to serve a particular segment from the second level of the retailing pyramid. In the Israeli business jargon they are termed private retailing chains. In 1992, the largest three private chains were Habib, Half- Price, and Tiv Taam. The first two are discount retailers who operated in the peripheries and suburban areas and target low income consumers. Tiv-Taam had chosen a different positioning, targeting Russian immigrants -- a market segment of more than a million consumers, characteristics by low-medium income and preferences for non kosher food. The three private chains accounted for 4% of the food sales. The other 47% of food sales were divided among the remaining 3000 old fashion groceries.

During 2002-2005, the tendency of differentiation and segmentation has intensified. The discount chains had bloomed, hurting the sales and profits of the large three giants. Tiv-Taam changed its positioning and upscaled itself to the medium-high income consumers who seek culinary excitements, which could be found more easily in the non kosher food chain that offer a larger variety than the large chains who binded themselves to kosher customers.

The reasons for the growth in the market share of the discount retailers resulted from the 2001-2003 recession and the wrong marketing strategy of the large retailers. In 2004, the market share of the largest two supermarket chains, Supersul and Coop, was 26.6% and 25.5%, respectively, Club market's market share was 13.8% (it continued to decline in 2005 to 13.4%). The market share of discount chains and the specializing retailers rose to 14% - 18%. The private groceries, suffered from the development of the market. The growing power of the large retailing chains and the rising attractiveness of the specialized and segmented chains have changes the rules of the game. Squeezed by the large chains from above and by discounters from below, groceries were expected to adopt the survival strategy that has been adopted by groceries in the U.S. and Western Europe -- switch to delicatessen, strengthened the personal service dimension, and focused on special needs, i.e., niche strategy. Failure to adopt these strategies resulted in further reduction of market share. Food groceries market shares declined in 2004 to 14.8%. Groceries lost 66% of their market shares over a period of 2 years!

The 2001-2003 economic recession reduced food demand and consumers, seeking to save income, were willing to increase transaction costs and change buying habits, e.g. buying low price substitutes and shopping at suburbs in discount shops. The large chains reacted too slow. The large chains lowered prices, changed their store portfolio and replaced local neighborhood branches into semi-discount stores. The changes in preferences of buyers enabled the rapid expansion of the discount retailing chains. This expansion increases their bargaining power, reduced the price they are paying to their suppliers and enabled the discounters to further reduce their price. The increased attractiveness of the discount chains over the senior food retailers may be partly irreversible, as buyers may change their buying habits for a long time.

A threat from a different direction came from the strategy of Tiv Taam and its followers. Tiv Taam changed its positioning into high quality, offering products that are out of reach in the senior food retailer due to their self imposed kosher foods restrictions (about 40% of Israel's population define themselves as seculars).

Part 6 - Agricultural and agro industrial policies

A. Brief history of major policy developments

Main strategic developments occurred in the last two decades:

1. The socio-economic and demographics structure of the Israeli farm has changed. From full-time, self employed farmers to part-time farmers who rely on hired work.
2. The share of income from agriculture and agro-industry declined and a larger portion of the household income comes from services and work outside the farm.
3. Farmers (particularly old farmers) whose children chose not to continue farming sold or lease their farms (with the production quotas, water permits etc.) to those that continue farming. Active farms became larger and enjoy economies of scale.
4. Supply constraints became more binding as the alternative cost of land and water soared. The large immigration waves and the growing population raised the price in the urban areas. Water became scarcer and its price for agricultural usage increased. Water usage has been administrated by setting quotas. These restrictions caused growers to abandon land and leave it uncultivated.
5. Growing competition from other Mediterranean countries, African countries and South American, changes in taste of consumers.
6. Technology changes enabled the production of higher yields using a smaller workforce.
7. Like other developed nations, Israel's economy has become bi-polar economy with hi-tech and service industries at the one end the low-tech and manufacturing industries at the other end. The large wave of Russian immigrants increased Israel's human capital, as many of them were highly educated and skilled. (Alas, the proportion of young individuals who choose to learn technology and mathematical skills decline and that places a threat for the high tech industry in Israel.) Educated individuals seek employments in high pay sectors, which do not include agriculture.
8. The days where Israeli farmers (kibbutznikim and moshavnikim) enjoyed a prestigious image are long gone.
9. The government, in an effort to help the financially troubled kibbutzim and moshavim, has been changing the land property rights, enabling using changing some land from agricultural to urban.
10. Israel is a member of the WTO, which limits its regulation tools.
11. The retailing system in Israel became very concentrated and the bargaining power of the logistic centers operated by the three big retailing chains grew enormously, while the growers did not succeed in building a countervailing power.

These changes and forces call for a major strategic change. The agricultural sector should have focused either in strategy aimed at developing a technology that will enable production in lower cost than the competition or differentiating the produce, or alternatively adopt a strategy of producing only high value crops where the high education and the technological sophistication would be an advantage.

The changes that the agricultural sector is experiencing are:

1. The Israeli agriculture changed its strategy from mass production into specializing high technology oriented marketing.
2. Increasing imports of low value foods and increasing exports of high value foods.
3. Increase in the power of high tech R&D firms: seed, breeding genetics, agbiotech
4. Decline of traditional industries: citrus, cotton wheat.

B. Economic situation and its effects on the agricultural and food sectors

The average monthly salary (before tax) was 7550 NIS and 7400 NIS in 2004 and 2005, respectively. The decline is partly due to overall economic conditions and partly due to reduction in government transfer payments and subsidies. The average agricultural monthly salary was 4542 NIS.

The average cost of living, calculated as the basic expenditures for food, housing, health insurances, education and cultural activities, was 7500 NIS for a family of four. With both parents working in agriculture the combined income still falls below the average cost of living.

C. Governmental Support

The Israeli Government involvement in the agricultural sector activities has been criticized to be far above the share of the agricultural sector in the economy. The agricultural political lobby succeeded to guarantee a some support, agricultural subsidies in Israel are way below their counterparts in the EU and North America.

Governmental support is classified into direct support, which is the complete set of regulation that apply to the agricultural sector and the budget that reflects the share of importance attributed to the sector, and to indirect support, which applies to laws and regulation exempting farmers from restrictions imposed on other sectors.

Direct governmental support during 2004 includes the following items. 66 million NIS were directed to subsidizing investment, such as dairy barns designed to meet new environmental regulations, and replacing irrigation facility to efficient, water saving systems. 258 million NIS used to subsidize irrigation water and compensate farmers for water use restrictions. 247 million NIS were spent on training and inspection services (SHAHAM, agro technical inspection); 166 million NIS to government R&D, the majority of which is directed towards development of new varieties and new pesticides. A budget of 52 million NIS was allocated to the damage and disaster insurance fund, which is a semi governmental insurance company insuring (in subsidized rates) growers from natural disasters. 75 million NIS spent on minimal salary and income guarantees for local market farmers and in particular small chicken growers in the Galilee (the Galilee law). 11 million NIS were allocated to export subsidies. The support for the agricultural export has been reduced dramatically since 1995 mainly due to GATT and WTO restrictions.

Indirect Support: The indirect support is realized in five domains: exemption from antitrust law, exemption from collecting (and paying) VAT, import barriers (custom, regulations), subsidizing the cost of land leases, issuing import licenses. The marketing and growers boards were exempted from the antitrust law, i.e., cartelization of growers and marketers was allowed only to the agricultural sector. In 2005, a new law abolished the historic exemption, except for dairy and poultry production and imports, which are still negotiated.

D. International trade policies

On November 1995 in Brussels, an agreement between the European Communities and their Member States and the Israel was signed (hereinafter referred to as "the Euro-Mediterranean Agreement") and entered into force on 1 June 2000. The Euro-Mediterranean Agreement was validated in January 2005, and applies to all member, including the new ones (the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia

In Article 6 and 8 of the basic agreement from 1995, a free trade area between the EU community and Israel shall be reinforced according to the modalities set out in Euro-Mediterranean Agreement and in conformity with the provisions of the GATT and the WTO. Customs duties on imports and exports, and any charges having equivalent effect, shall be prohibited between the Community and Israel. This does not include all agriculture products, Article 11 of the agreement specifies that the Community and Israel shall progressively establish a greater liberalization of their trade in agricultural products of interest to both Parties and Article 14 indicates that the Community and Israel shall examine in the Association Council, product by product and on an orderly and reciprocal basis, with the possibility of granting each other further concessions.

Protocol No.1 contains arrangements of importation into the Community of agricultural products originating in Israel and Protocol No. 2 the importation of agricultural products into Israel originating in the Community.

E. Main aspects of protocol No.1

- The products listed in the Annex, originating in Israel shall be admitted for importation into the Community, according to the conditions contained hereafter and in the Annex.
- Customs duties are eliminated or reduced as indicated in column "**a**".
- For certain products, customs duties are eliminated within the limit of the tariff quotas listed in column "**b**" for each of them. These tariff quotas shall apply on an annual basis from 1 January to 31 December, unless otherwise specified.
- For the quantities imported in excess of the quotas, the common customs duties are, according to the product concerned, applied in full or reduced, as indicated in column "**c**".
- For certain products, the exemption of customs duties is granted in the framework of reference quantities as indicated in column "**d**".
- For all the products listed in the Annex, the tariff quota and references quantity volumes are increased from 1 January 2004 to 1 January 2007, in four equal installments, each corresponding to 3% of these volumes.
- Selected produce applying to protocol 1:

Description	a	b	c	d	e
	Reduction of the MFN customs duty %	Tariff quota (t, unless otherwise indicated)	Reduction of the MFN customs duty beyond current or possible tariff quota %	Reference quantity (t, unless otherwise indicated)	Specific provisions
Cut flowers and flower buds, fresh	100	19 800	0		
New potatoes, from 1 January to March 31, fresh or chilled	100	30 000	0		
Tomatoes, fresh or chilled	100	9 000 for cherry tomatoes ⁴ + 1 000 for others	0		
Sweet peppers, fresh or chilled	100	15 400	40		
Avocados, fresh or dried	100	-	80	37 200	
Oranges, fresh	100	200 000	60		
Lemons, fresh	100	7 700	40		
Grape juice, including grape must	100	2 000	0		

F. Main aspects of protocol No.2

- The products listed the Annex originating in the Community shall be admitted for importation into Israel according to the conditions contained herein and in the Annex.
- Import duties on imports are either eliminated or reduced to the level indicated in column "a", within the limit of the annual tariff quota listed in column "b", and subject to the specific provisions indicated in column "e".
- For the quantities imported in excess of the tariff quotas, the customs duties are, according to the product concerned, applied in full or reduced as indicated in column "c".
- For all the products listed in the Annex, the tariff quota and references quantity volumes are increased from 1 January 2004 to 1 January 2007, in four equal instalments, each corresponding to 3% of these volumes.

Selected produce applying to protocol 2:

	a	b	c	d	e
Description ⁽¹⁾	Reduction of the MFN customs duty %	Tariff quota (t, unless otherwise indicated)	Reduction of the MFN customs duty beyond current or possible tariff quota (%)	Reference quantity (t)	Specific provisions
Milk and cream in powder, granules or other solid form, of a fat content, by weight, not exceeding 1,5%	100	1 500	55% within an additional tariff quota of 1 500 t		
Butter and other fats and oils derived from milk; diary spreads	100	350	0		
Cheese and curd	100	500	0		
Garlic, fresh or chilled	100	200	25		
Peas, <i>Pisum sativum</i> , dried and shelled, for sowing	100	100	0		
Grapes, dried	100	100	25		
Apples, fresh	100	2 300	0		
Other wheat and meslin	100	150 000	0		
Barley	100	210 000	0		

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Table 3

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Table 4

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Figure 1

Agriculture in Israel (the Industry Account, Area and livestock, Price Index of Output and Input) 2001-2003, central bureau of statistics of Israel September 2004, Table 1.

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Table 10

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Figure 5

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Figure 7

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Table 13

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