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Indicators for Sustainable Development in Israel

Second Phase

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I. BACKGROUND

1. Introduction

Sustainable development policy in Israel aims to respond to the development needs of a progressive, modern and egalitarian society, while preserving vital spatial and environmental resources.

The policy is designed to accommodate a growing population and a continuous rise in standard of living, while wisely and efficiently utilizing the country's resources and assuring opportunities and services to the weakest population groups; to allocate space for development and building while conserving land resources, especially high quality and sensitive ones; to meet the annual demand for water while preserving the quality of different water sources and assuring their quantity and continuation for future generations; and to meet the needs of industry, transport and energy production while maintaining air quality for the pleasure and health of the general population.

Indicators are expected to help assess the environmental implications of development trends and to test whether they advance or contradict sustainable development policy. Indicators also help to check whether development takes into account the scarcity and vulnerability of environmental resources and uses them cautiously and prudently, or needlessly depletes them. One of the main aims of the indicators is to set "red lights" in those areas in which discerned trends substantially contradict sustainable development principles. The role of indicators is to guide human actions so that most of the resources remain for present and future generations and to assure well-being and ample opportunities to the general public, including the weaker sectors of the population.

The process of formulating sustainable development indicators in Israel began with discussions about the nature of such indicators, their compilation from different sources and their appropriateness to conditions in Israel. A range of experts from different disciplines participated in the discussions and reviewed development trends and indicators that would be most suitable for depicting trends in Israel. A report entitled "Sustainable Development Indicators in Israel, Summary Report Phase I " first proposed a series of indicators, some of which were based on international sources following adaptation to Israel's needs, and some of which were developed from the outset to respond to Israel's unique conditions.

Although Israel resembles developed Western countries, it nevertheless differs from them in term of its dimensions, physical conditions, rate of development and way of life. The accelerated development which the country has witnessed over the past 60 years is essentially unmatched in Western countries. Israel's population grew more than tenfold from the time the state was first established, and massive development was needed to respond to such accelerated growth – in terms of built-up area, industry, infrastructure development and utilization of scarce land and water sources.

Alongside the emphasis placed on environmental aspects and the need to leave resources for future generations, indicators were also chosen to reveal social and economic trends. Concern for the weaker sectors of the population and prevention of poverty and economic deterioration are significant directions in achieving sustainable development and are represented by a specific series of indicators.

The current document presents ten indicators which are based on the first phase report. These indicators were selected to represent the groups established in Agenda 21 in the social, environmental and economic realms, with the exception of the institutional realm.

The first two phases of the project represent the beginning of an extended process of formulating a comprehensive, dynamic and up to date system of indicators. This system will serve as a tool for policy makers, government bodies and the environmental administration in monitoring the success and effectiveness of trends in achieving sustainable development.

2. Indicators for Sustainable Development in Western Countries

Indicators for sustainable development are signs which help to reveal development trends and show to what extent they correspond to or contradict the advancement of sustainable development.

Indicators examine pressures on environmental resources and their causes and help indicate possibilities for reducing these pressures efficiently. They are designed in such a way as to present the current state and trends of change in relation to long term targets. In this way, they serve as more than a monitoring measure but also as a tool for policy formulation by decision makers.

Indicator systems for sustainable development have been developed throughout the world, each with its own emphasis. Following is a summary of some representative indicator systems.

2.1. Environmental Indicator System for the European Union Countries – EEA

The European Environment Agency (EEA) is a scientific body founded to monitor environmental trends in Europe. This agency produces, among others, comprehensive reports once every five years, beginning with 1994. The reports survey subjects related to policy setting in European countries as a whole and monitor the implementation of European Union (EU) guidelines. The EEA report defines priority areas for monitoring: climate change, nature and biodiversity, environment, health and quality of life, natural resources and waste.

Trends in EU states focus on the following subjects:

- Environmental aspects of consumption patterns and steps to restrain over-consumption.
- Scope and manner of use of global resources, not only local consumption.
- Depletion of the earth's natural capital and damage to natural systems.
- Review of dispersed pollution sources and their mitigation.
- Confronting natural and man-made hazards in natural systems.

A comparison between European states was made on the basis of 37 environmental indicators. The description of each indicator begins with a relevant policy question and continues by specifying the context of decision making in each area (environmental legislation, environmental decisions, etc.). A comparison between the states is then presented in relation to target achievement in nine main environmental areas, including: greenhouse gas emissions, energy consumption, renewable energy, air pollution, ozone depletion, freight transport demand, organic agriculture, municipal waste and greywater use. Based on the findings and on the analysis of the indicators, eight areas which call for a change in policy were identified: reducing household consumption, EU expansion, abating biodiversity loss, promoting sustainable use and management of natural resources, integrated policy, increased focus on climate change, greater attention to the global environment and increased emphasis on the link between environment and health.

The report also defines the desirable targets for the next report and the progress achieved in meeting the targets in relation to environmental conventions, foremost among which is the Kyoto Protocol.

2.2. Indicator Development in the OECD Framework

According to the Organization for Economic Cooperation and Development (OECD), environmental indicators on their own are not effective in reducing the driving forces responsible for environmental deterioration. The basic assumption is that human activity puts pressure on the environment and that this pressure may harm environmental, economic and social systems. Therefore, policy should relate to human activities and respond to these changes.

In order to identify trends in different areas, a system of indicators was defined to check driving forces and indicate areas in which intervention could bring about a change in undesirable trends.

Within this framework three categories were defined – pressure, state and response (PSR).

- **Pressure** – Indicators to identify environmental and human responses to the pressure created.
- **State** – Indicators to identify processes which create undesirable environmental impacts.
- **Response** – Indicators to examine changes in the state of the environment in light of implemented policy and measures.

Five sets of indicators were defined, each integrated within the other. Each set of indicators corresponds to a specific goal and audience. The following table presents the five sets of indicators, their function, target audience and goal:

	Key Indicators	Core Indicators	Sectoral Indicators	Indicators Derived from Environmental Accounting	Decoupling Environmental Indicators
Function in the System	Informing the public	Tracking environmental progress	Promoting integration		Monitoring progress toward sustainable development
Target Audience	Public and high ranking decision makers	Governments and environmental decision makers	Governments and decision makers in different sectors		
Features and Scope	Used for international comparison	Used for decision making on the national and sectoral levels			

a. Key Indicators – include a limited set of indicators vital for identifying the main environmental trends. This set is composed of ten indicators related to pollution and natural resources and assets:

- Issues relating to pollution include climate change, ozone layer, air quality, waste recycling and water quality. The five corresponding indicators are: carbon dioxide emissions, consumption of ozone depleting substances, emissions of nitrogen and sulfur compounds, waste recycling in local authorities and extent of wastewater treatment.
- Issues relating to natural resources and assets include water resources, forest resources, fishing resources, energy resources and biodiversity. The five corresponding indicators are: intensity of water resource use, intensity of forest resource use, intensity of fishing resource use, intensity of energy use and endangered species.

Each of these indicators constitutes a subsystem of several indicators which deal with the same issue. Thus, for example, the indicator for carbon dioxide emissions is made up of emissions per capita, emissions per gross domestic product and rate of change in emissions since 1980.

b. Core Indicators – include the key indicators plus additional environmental indicators. This group represents a wider range of environmental subjects which relate to most of the member states in the organization. However, this set only includes some 40-50 indicators. Climate change, for example, is represented in the key indicator category by the indicator of carbon dioxide emissions. In the core indicators, climate change includes several indicators which are categorized according to the PSR framework. The indicator used to measure the pressure on the environment which causes climate change is greenhouse gases emissions, which is composed of emissions of CO_2, CH_4, N_2O, PFC, HFC and SF_6. The indicators used to measure the state of the environment in relation to climate change are greenhouse gas concentrations in the atmosphere and the global means temperature. The indicator used to measure response relating to climate change is efficiency of energy use which is composed of the rate of energy use and economic and fiscal instruments.

c. Sectoral Indicators – give expression to the interdisciplinary aspect of sustainable development. This set of indicators is the only one to measure aspects which go beyond environmental aspects and to examine the links between them and the environment.

d. Environmental Accounting Indicators – utilize physical natural resource accounts as well as environmental expenditure accounts.

e. Decoupling Environmental Indicators – measure the decoupling of the long-term link between economic progress and exploitation and deterioration of environmental resources. These indicators examine this decoupling on the macro level and the sector level.

Initially, the OECD environmental indicators were only perceived as a system for environmental review, but economic and social indicators were eventually added. Attempts were also made to examine the links between justice, poverty and environmental state, on the one hand, and consumption patterns and unsustainable production, on the other hand.

OECD Environmental Outlook: Forecast for 2020 on the Basis of the Indicators

OECD was the first organization to develop a system of indicators for sustainable development. In 2001, the organization published a forecast on the state of the environment in developed countries for 2020. Based on the indicators, this forecast was meant to discern sectors in which improvement was needed and to define ways in which to effect such improvement.

The indicator-based environmental outlook was divided into three levels which are graphically represented by traffic light signals: A green light signifies the possibility of "proceeding cautiously"; a yellow light signifies that further review is needed to assess the trends and their significance and to establish environmental policy; and a red light signifies a negative state which calls for changing the discerned trends and taking urgent action.

Signals of the OECD Environmental Outlook

	Green Light 	Yellow Light 	Red Light 
Pressures on the Environment	Industrial point source pollution Some air pollutants	Water use Toxic emissions from industry Hazardous waste generation Energy production and use	Agricultural pollution Over-fishing Greenhouse gas emissions Motor vehicle and aviation air pollution emissions Municipal waste generation
State of the Environment	Forest coverage	Surface water quality Forest quality Ozone layer integrity	Biodiversity Tropical forest coverage Fish stocks Groundwater quality Urban air quality Climate change Chemicals in the environment
Societal Response	"Green" purchasing "Green" agriculture Protected areas Resource efficiency Energy efficiency	Biotechnology Forest plantations Aquaculture Energy and transport technologies Waste management	

2.3. Developing Indicators in the UNCSD: Division into Four Areas

Corresponding to Agenda 21

The UN Commission for Sustainable Development (UNCSD) was established in the aftermath of the 1992 Earth Summit in Rio de Janeiro. In 1995 it called for developing a system of indicators in four areas defined in Agenda 21: economy, society, environment and institutional organization.

The work plan of the UNCSD included three different stages. In the first stage, a list of 134 indicators was formulated which were characterized by the Driving Force-State-Response (DSR) framework, which improves on the PSR framework. The PSR method was originally developed by the OECD when the concept of sustainable development was still in its infancy and largely focused on environmental indicators. In the improved framework, D, which stands for driving force, substitutes for P, which denotes environmental pressure. This change reflects the wider reference to the economic and social aspects of sustainable development. In the second stage, 22 countries were chosen as pilots for testing the indicators. In the third stage, in light of the pilot's lessons, a final list of 58 indicators was formulated in 2001. While constituting an improvement over the first list, these indicators cannot be implemented in every state. Adaptation and formulation of different or complementary indicators is needed for different countries.

Despite the limitations and disadvantages of the UNCSD indicator system, it constitutes the most widespread basis for discussion and review of sustainable development indicators in the world today.

Indicator Development for Mediterranean States – UNEP-MAP – Blue Plan

The indicator system of the Blue Plan specifically relates to Mediterranean coastal countries. The Blue Plan formulated a list of 130 indicators divided into six sectoral frameworks which are derived from the guidelines of Agenda 21: population and society, territory and human settlement, economic activity and sustainability, environmental quality, sustainable development - players and policy, and cooperation in the Mediterranean region. The indicators are based on the PSR framework. Their innovation lies in their classification according to an additional section, the geographical scale – regional, national, coastal and site location. For example, indicators on marine and coastal issues are classified according to the following spatial scale:

a. National Level

Indicator number 32: Coastal erosion

Definition: The length of a given coastal strip undergoing erosion, whether manmade or natural, expressed as a percentage of the total coastal strip.

Methodological description: Erosion is a natural phenomenon which occurs to different degrees in some Mediterranean coasts. The main causes of this phenomenon are seawater, wave intensity and marine currents. The effect changes according to the features of the coast (rocky or sandy). As a result of this erosion, the coastal line recedes, with the most severe manifestation in river estuaries. Calculation of the indicator depends on available sources in each country and on means of identifying coastal line changes.

b. Coastal Area Level

Indicator 33: Protected coastal area

Definition: The total of protected areas in a specific year, which include coastal ecosystems (continental and marine).

Methodological description: National legislation exists in all countries regarding the protection of natural heritage. For the sake of comparison, protected areas are listed under categories defined by the International Union for Conservation of Nature and Natural Resources (IUCN). IUCN defines six categories of protected areas in two groups: fully protected areas – natural reserves, national parks and natural monuments; partially protected areas – habitats, protected land and marine landscapes and protected resource management zones.

Out of all of these areas, the total protected areas in the country which include a coastal segment are totaled.

In addition to these 130 indicators, the Blue Plan also developed a more limited system of 34 indicators to monitor sustainable development progress in the Mediterranean region, within the framework of the Mediterranean Strategy for Sustainable Development. The strategy responds to four targets (parallel to the distribution of indicators in the CSD: economy, society, environment and institutional) and is composed of seven sectors (water, energy, transport, tourism, agriculture, urban development and coastal areas).

2.4. Aggregative Index (ESI)

This index reflects a totality of factors and their interrelationships which impact on sustainable development. The index enables a comparison between countries and their ranking in relation to one another. The disadvantage of this index lies in the difficulty to develop a single indicator which accurately reflects a complex state. An example of such an aggregative index is the Environmental Sustainability Index of the World Economic Forum. In 2005, the ESI ranked Israel in the 62nd place among 146 nations, with a score of 50.9, due to the intense pressures on land and water. In comparison, Finland was ranked first with a score of 75.1 and North Korea last with a score of 29.2.

3. Development of Indicators in Israel

3.1. Indicator Selection

In the current phase, indicators are presented as a first step in the process of formulating a comprehensive system of indicators for sustainable development in Israel. The indicators were formulated on the basis of a proposal included in the first phase of this project, based on available data in the Central Bureau of Statistics.

Indicator selection was based on a comprehensive review of studies carried out in different frameworks and according to the following considerations:

- Recommendations of the first stage of the project which were based on thematic background papers.
- Existence of an available and reliable database for the analysis of the indicator.
- Correspondence to the Blue Plan indicators.
- Indicators recommended within the framework of a committee to review Israel's sustainable development strategy.

The indicators were classified according to six subjects established for the UNCSD system: economic growth, level of social and environmental equity in the present generation, capacity to cope with environmental issues, protection of the interests of future generations, efficiency of natural resource utilization and quality of life of the present generation.

3.2. Methodology for Indicator Analysis

The indicators in this report encompass a wide range of subjects which represent different areas of sustainable development. The differences and variety of the indicators call for standardization of the process for two primary reasons:

- Ability to compare between the indicators and objectively track trends in each area.
- Establishment of a basis for comparison between indicator systems in Israel and worldwide

Each of the indicators is described in detail according to the following sections:

Nature of the Indicator

A short introduction including a description of the indicator, the ways in which it will identify changes in direction and trends, the indications for these changes and the significance of the indicator for sustainable development.

Database

Definition: Definition of the basic concepts and terms related to the data used for indicator analysis.

Data Source: A reliable and timely source of data is a prerequisite and basis for an indicator system. For the most part, the data sources in this project are data compiled and produced by the Central Bureau of Statistics (CBS). These data encompass different subjects and some are provided to the CBS by external sources (Hydrological Service, JNF-KKL and others). In a few cases, when CBS data were missing, other sources were used.

Collection and Calculation Method: Specification, as far as possible, of collection methods, sampling methods and data processing and analysis.

Data Limitations: Extent of compatibility of the measured data with the description of the phenomenon, limitations in assembling the samples, errors in sampling and data collection, inconsistent and irregular data collection, limited time period for data collection, etc. weaken the link between the collected data and the examined phenomenon.

Indicator Analysis

Discernible Trends: The results were presented as a time series, based on the availability of the data over the years. This allowed for a depiction of the changes and trends in the specific area over time.

Reasons and Explanations for the Trends: This section seeks to explain the changes which occurred in a specific area. When man-made, these changes are meant to indicate the link or the influence between human activity and the trend.

Sustainable Development

Link between the indicator and sustainable development: This section relates to the indicators according to their classification into environmental, economic and social groups.

In the **environmental realm**, the link between the trends and the environmental phenomena is sought: is it stable, improved, deteriorating?

In the **economic realm**, the results indicate the economic level of individuals in society and the economic growth in given time periods.

In the **social realm**, the focus is on identifying well-being and quality of life, inequality and gaps, especially where costs would be imposed on the weaker sectors of society and where benefits would be reaped by a small group.

Data limitations related to sustainable development: Indicators generally reveal a specific direction which reflects the general trend in a defined subject. However, since sustainable development encompasses wide-ranging activities and conditions, which are all interrelated, identifying a specific trend may well indicate a direction in this specific realm but not a general direction. This is the main weakness of the indicator system. Therefore, a more systematic vision based on the observation of a series of indicators is needed in order to gain a comprehensive view. This section focuses and specifies the limitations in each subject.

Linkage to other indicators

One indicator is frequently insufficient to describe a trend, even in a single and defined subject. Several indicators, covering different aspects or parts of a certain subject, are necessary in order to understand the trend. This section specifies the additional indicators which are needed to complete the general picture in a specific subject.

Recommendations for improving the indicator and furthering its development

On the basis of the results, a series of recommendations was defined, whether on the further development of the specific indicator or analysis of additional indicators necessary to complete the picture. Where possible, recommendations were also made on processes to change the trend.

4. Continuation of the Process

Indicators were defined which are unique to the conditions of the country and reflect its specific problems and needs. Thus, for example, an indicator which depicts trends on open space in Israel, a country characterized by land scarcity, is of upmost importance. On the other hand, this indicator would be of low importance in land-rich and sparsely populated countries. Similarly, indicators which monitor basic conditions of well-being such as access to drinking water and health services would be of high importance in the Third World but of lesser importance in wealthy countries in which the entire population enjoys such services.

A major consideration in the first phase of this project was the need to develop a methodology for an indicator system which is adapted to Israel's unique needs, both because of the lack of databases and due to the inappropriateness of some international indicators from the Israeli perspective.

Attention should now be focused on preparing a long range plan for the development of an indicator system which would reflect Israel's unique conditions. Israel's economy is likely to continue to grow over the next decades. Increased development pressures, depletion of land and water resources and damage to biodiversity present the risk of irreversible deterioration, at the expense of future generations.

This report recommends that completion of the databases for the indicators which describe environmental deterioration in all areas should be a top priority in the development of an indicator system for sustainable development in Israel.

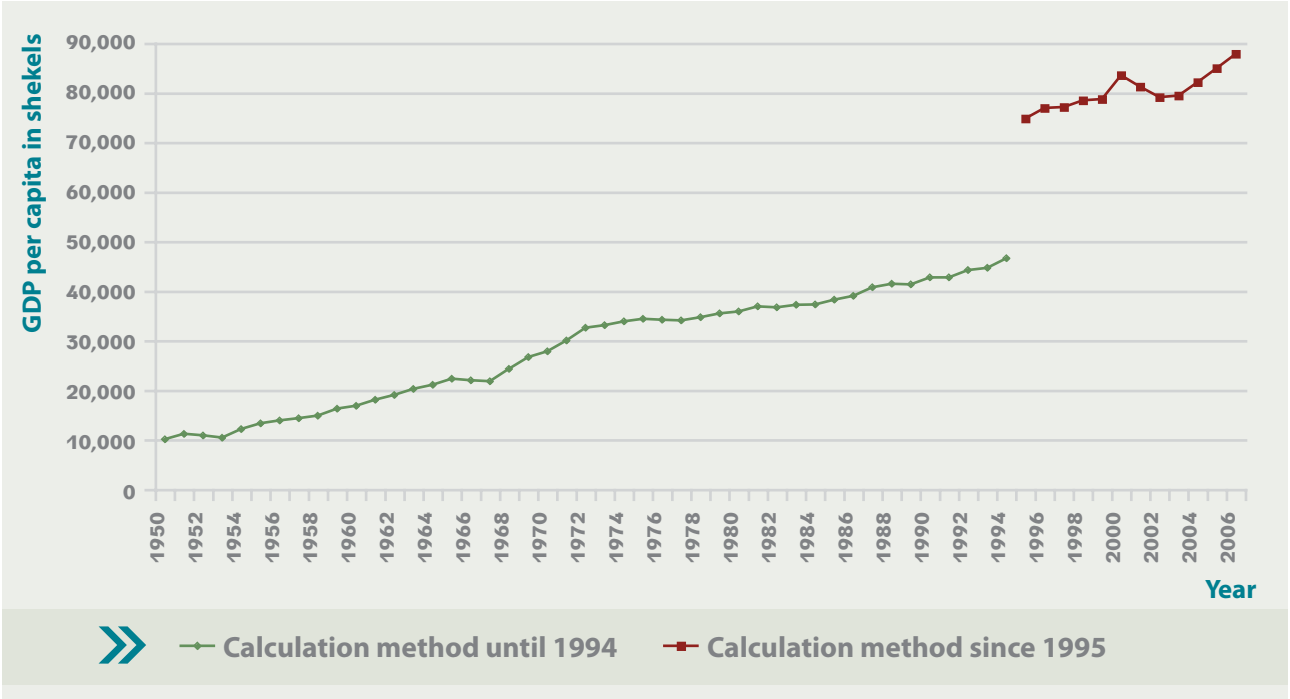
II. INDICATORS FOR SUSTAINABLE DEVELOPMENT IN ISRAEL

1. Gross Domestic Product

Gross domestic product (GDP) is defined as the total market value of all final goods and services produced in a given period of time before subtracting depreciation of capital stock and including net value added tax. GDP includes three components: expenditure for private and public consumption, gross investment (private and public) and net export of goods and services. GDP is an indication of the size of the economy, but in order to check the economic well-being of residents, GDP is divided by the total population to get an average value of GDP per capita. GDP per capita is generally used as a basis for comparison of standard of living in different economies.

An analysis of GDP per capita in Israel between the years 1950 to 2005 shows an almost constant increase, with some periods of decline, largely due to social and political factors on the national and international levels. High GDP per capital is one of the basic conditions for sustainable development and constitutes an indicator of the personal economic level of individuals in society. However, while GDP per capita is a principal indicator of the capacity of an economy to manage processes of sustainable development, it does not identify processes which contradict sustainable development principles. Additional environmental and social indicators would be needed to complement the findings of this indicator. Alternatively, a green accounting system, such as the System of Environmental and Economic Accounts (SEEA) could be developed.

Figure 1: GDP per capita in Israel between 1950-2006



Source: Central Bureau of Statistics

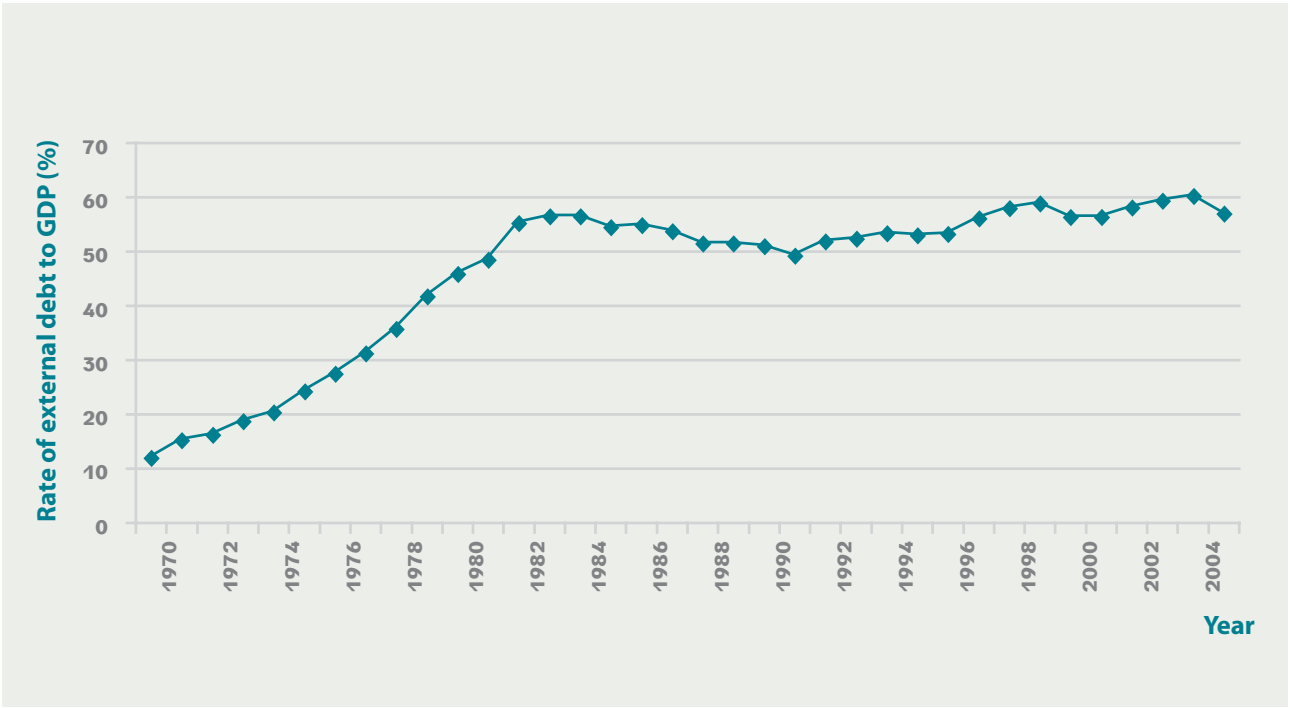
2. Ratio of External Debt to GDP

The external debt to GDP ratio reflects the net debts of the economy, including current and accumulated debts, less assets. A growth in external debt signifies that the economy consumes more than it produces and needs external sources. The external debt/GDP ratio indicates an economy's ability to service its external debt and pay it back and also reflects the economy's risk level.

In Israel the external debt to GDP ratio declined until 1961 and then increased until 1985. It grew from only 10% in the late 1960s to 56% in 1984. The ratio declined somewhat to a level of 50% in 1991 and then gradually increased. In 2004, the ratio reached a new peak of 62%.

In general, a higher ratio between external debt and GDP contradicts the principles of sustainable development. This is especially true when the debt is used for present consumption. However, if external debt is increased to help fund development and investments, the sustainable development implications are not so clear-cut. Investments in the present will also serve future generations, even with the added debt. At the same time, the investments themselves should be analyzed, with the understanding that long-term investments would be the ones to benefit future generations.

Figure 2: Ratio of External Debt to GDP



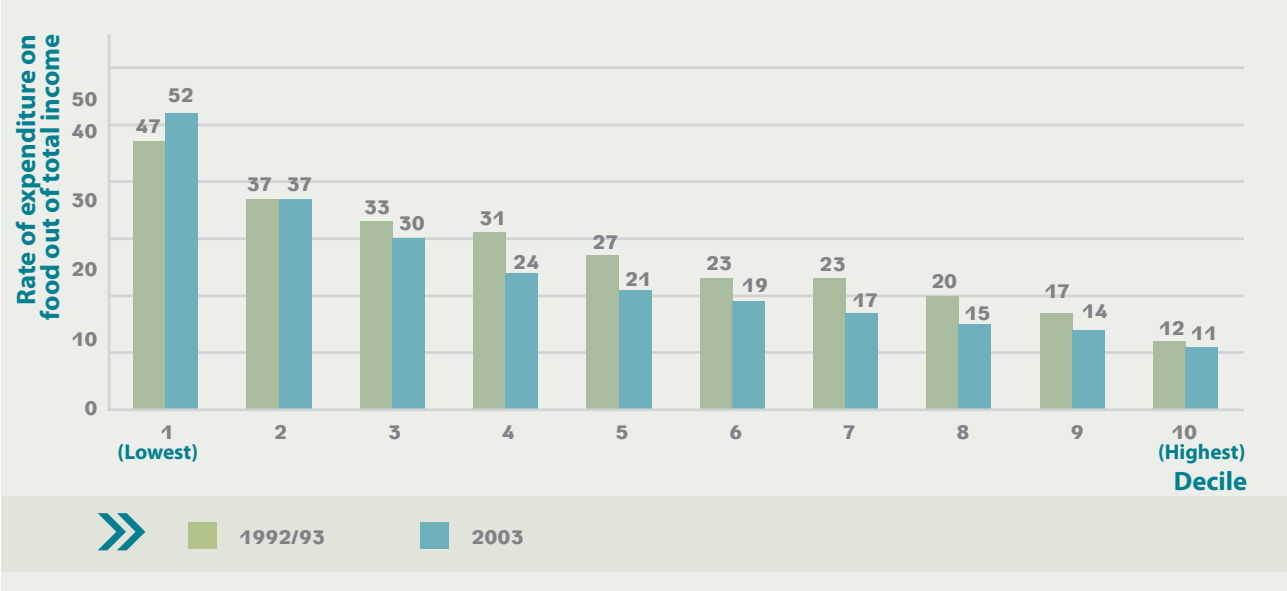
Source: Central Bureau of Statistics

3. Expenditure on Food out of the Total Income of Households (by Deciles)

This indicator largely reflects intragenerational equity and provides a partial picture of the gaps between different population groups. A household which expends most of its income on food will have less income to purchase goods and services such as education, culture and health. This may create a cycle of poverty which prevents equal opportunities for future generations as well.

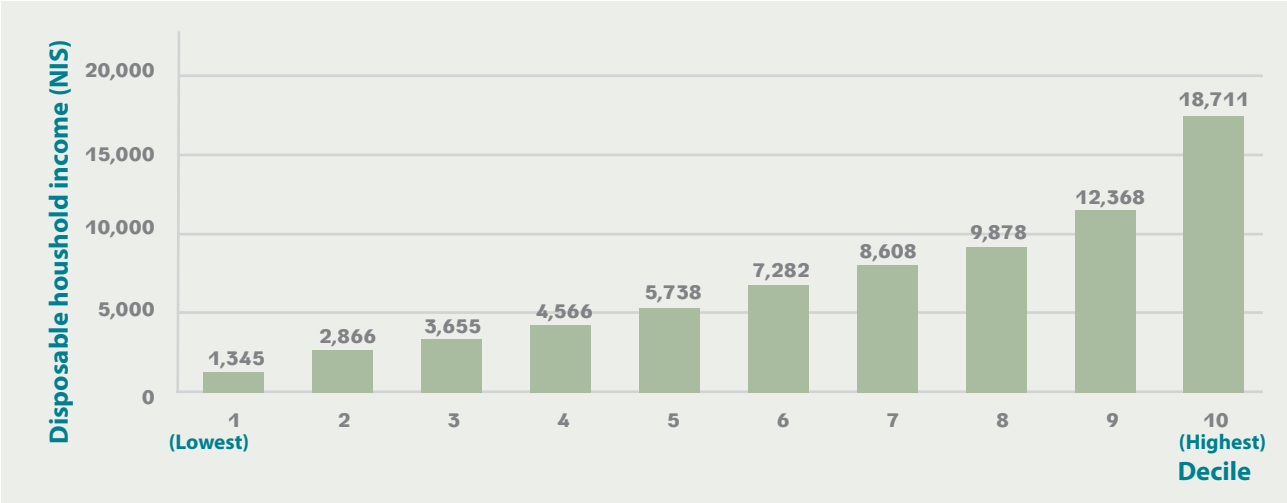
In 2003, the rate of food expenditure out of a household's total income in the lowest decile was 52%, in the fifth decile 21% and in the top decile 11%. Analysis of the changes in the rate of food expenditure between 1992/93 and 2002/3 shows an average 20% reduction in food expenditure, with higher expenditure in the lower decile. Trends reveal a growing gap in the rate of food expenditure between the lower and higher deciles, testifying to the growth in income gaps and inequities between the deciles. These trends contradict one of the main goals of sustainable development - reducing intragenerational inequity.

Figure 3: Rate of Expenditure on Food out of the Total Income by Income Deciles in the Years 1992/93, 2003



Source: Central Bureau of Statistics

Figure 4: Disposable Income after Deducting Expenditure on Food for the Household, by Income Deciles, 2003



Source: Central Bureau of Statistics

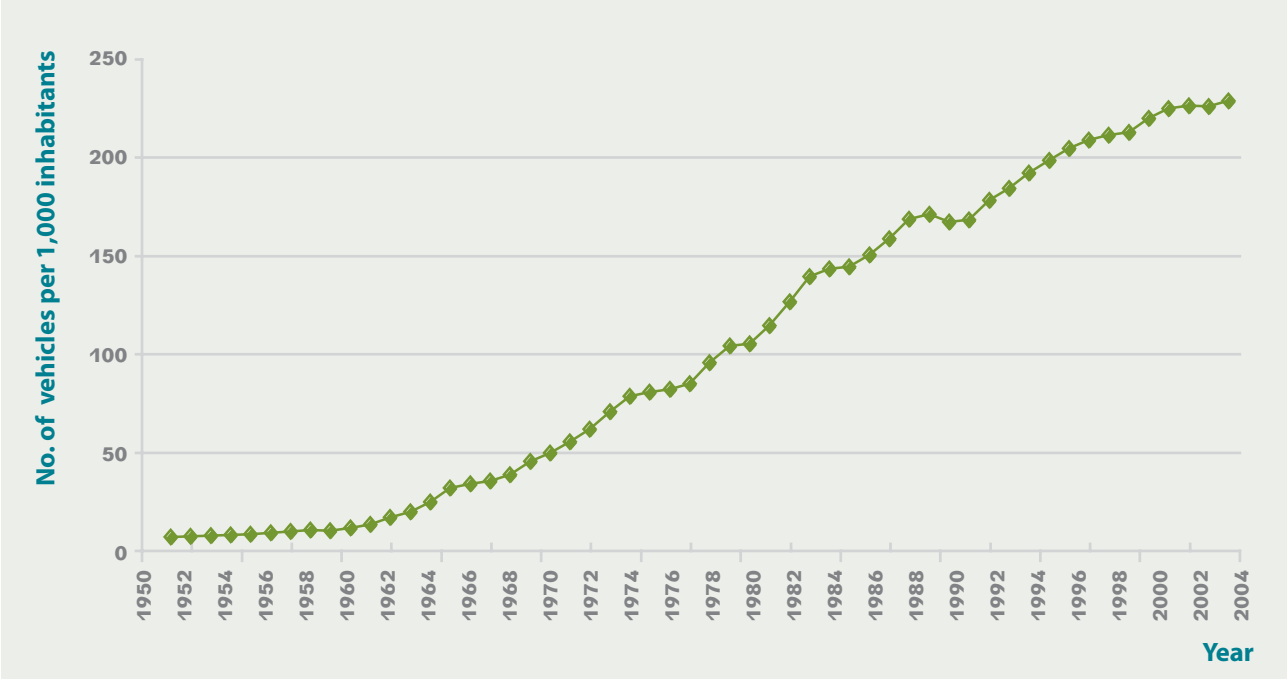
4. Motorization Rate – Number of Vehicles for 1,000 Inhabitants

The motorization rate is defined as the number of passenger cars per 1,000 inhabitants and is a common indicator in international comparisons of economic development and environmental issues. A high motorization rate corresponds with a high level of economic development and quality of life. On the other hand, increased numbers of cars are a burden on the environment associated with extensive use of energy sources, local and global air pollution, and development of road networks which encroach on public space and fragment natural habitats.

Between 1951 and 2004, Israel's motorization rate increased from 6 vehicles to 228 vehicles per 1,000 residents. A 300% increase was noted between 1960 and 1969 and a 111% increase between 1970 and 1979.

In terms of sustainable development, a high motorization rate is associated with air pollution in urban areas which is accompanied by extensive energy use, noise, urban heat island effect and road congestion as well as loss of open space as a result of road infrastructure development. The growth of suburbanization is also associated with increased use of private cars because of the inability of public transportation to service suburban residents. The success of a sustainable policy will largely be measured by its ability to divert a share of kilometers traveled in private vehicles to public transportation so as to diminish the burden on the environment.

Figure 5: Motorization Rate in Israel between 1950-2004



Source: Central Bureau of Statistics

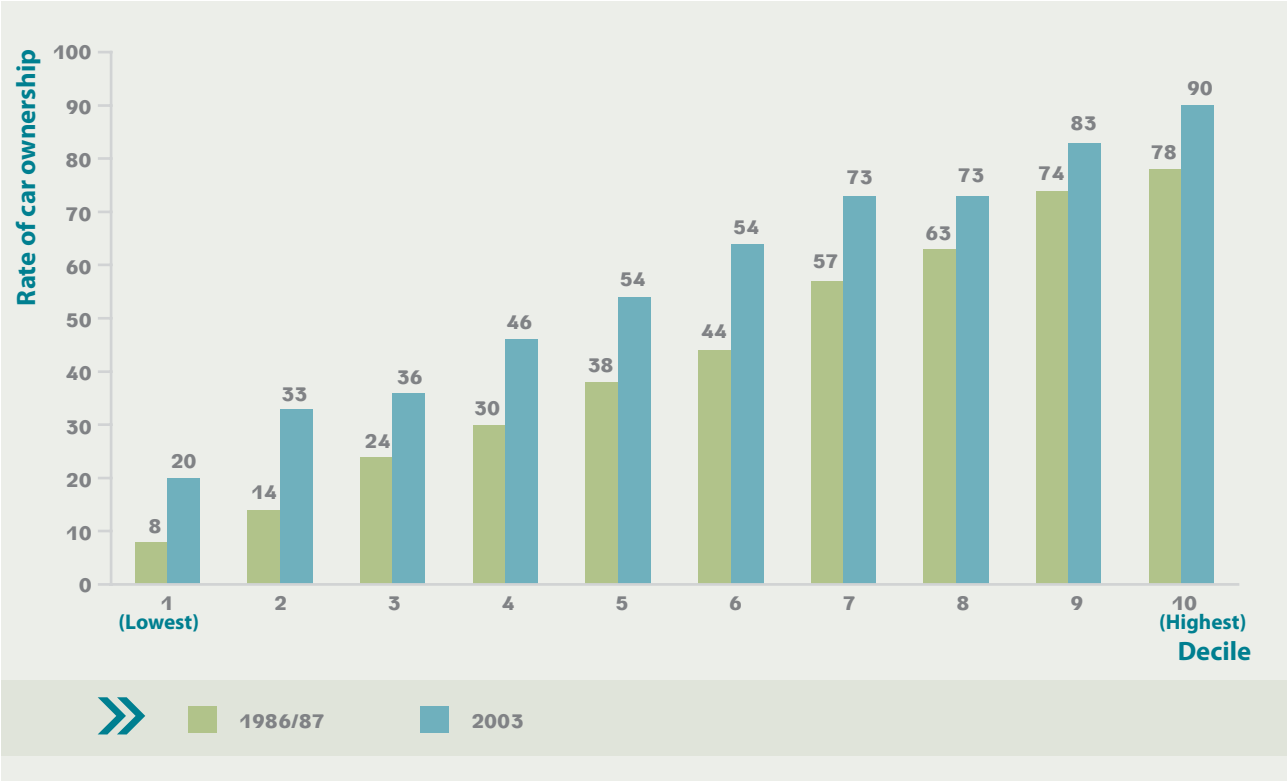
5. Car Ownership Levels by Income Deciles

The level of car ownership per income decile is an additional indicator of intragenerational inequity. Differences in car ownership levels reflect not only differences in economic status but also differences in access to opportunities and vital destinations.

Car ownership levels in Israel differ substantially between income deciles. In 1986/7, only 8% of all households in the lowest income decile owned a car compared to 78% in the highest income decile. The rate of car ownership increased among all income deciles in the 1990s and early 2000s, with higher growth rates in the lower income deciles, which reduced this inequity. In 2003, 20% of the households in the lowest income decile owned a car in comparison to 90% in the highest income decile.

Gap reduction in car ownership levels in the various income deciles is compatible with one of the main goals of sustainable development – intragenerational equity – since it increases equal opportunity and provides access to all areas of life: employment, trade, residence, open space and more. However, increased car ownership and use also increase pressures on the environment. The forecast is for car ownership rates in the lower income deciles to rise and inequity to be reduced. This trend necessitates parallel activities to promote the use of public transportation and restrain, as much as possible, the use of private cars, largely through improved availability and reliability of public transport.

Figure 6: Rate of Car Ownership by Deciles in Israel, in percentages, in 1986/87 and 2003



Source: Central Bureau of Statistics

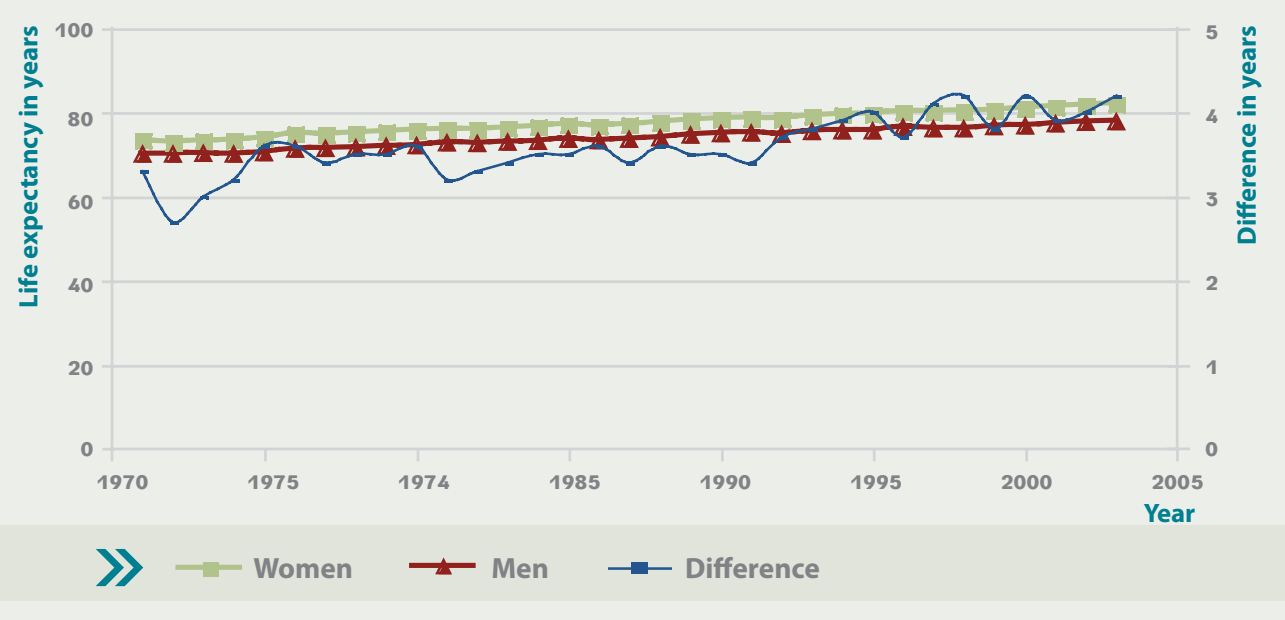
6. Life Expectancy at Birth

Life expectancy at birth, defined as the average number of years that a person is expected to live, is an indicator for public health. It is also an accepted indirect indicator for the population's standard of living and its awareness of health promotion. In developed societies, the constant rise in life expectancy is the result of a decline in infant mortality, reduction in infectious diseases and significant reduction in degenerative diseases.

In 2003, life expectancy for women in Israel reached 81.9 years (compared to 73.4 years in 1971) and for men 77.7 years (compared to 70.1 in 1971). Life expectancy in Israel has increased steadily among both sexes, maintaining and even slightly expanding the gap between the sexes. One of the main consequences of the growth in life expectancy is an increase in the adult population, which may be more exposed to chronic diseases and disability.

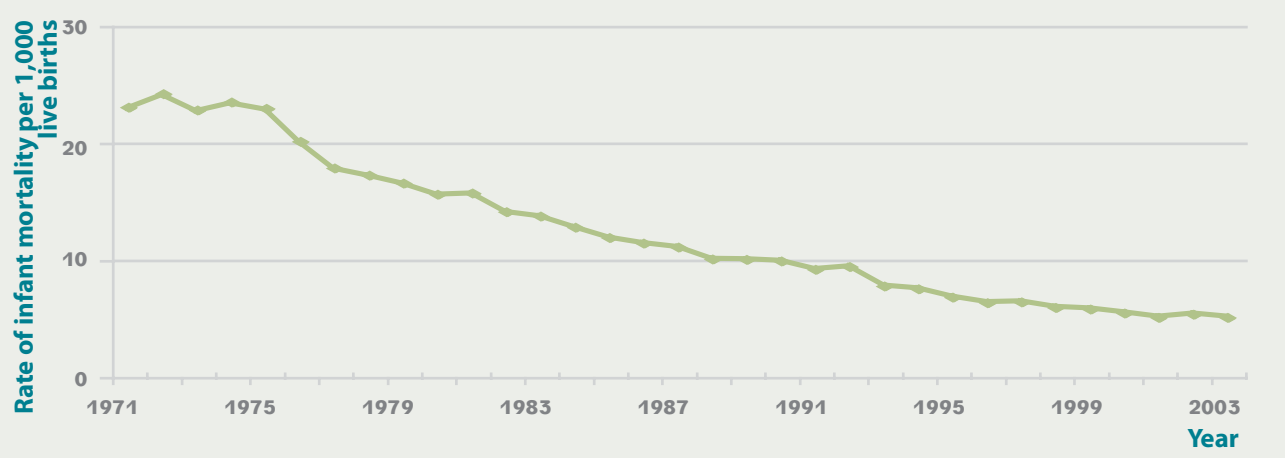
Sustainable health focuses both on the prevention of disease in the future and on the promotion of health for the individual and society in the present. This approach complies with the target of "Health for All" which was declared by the World Health Organization in 1986. It emphasizes prolonging life, improving health, increasing people's control over their health and achieving equity in health and health services.

Figure 7: Life Expectancy by Sex and Difference in 1971-2003



Source: Central Bureau of Statistics

Figure 8: Infant Mortality in Israel, Rate per 1,000 Live Births, 1971-2003



Source: Central Bureau of Statistics

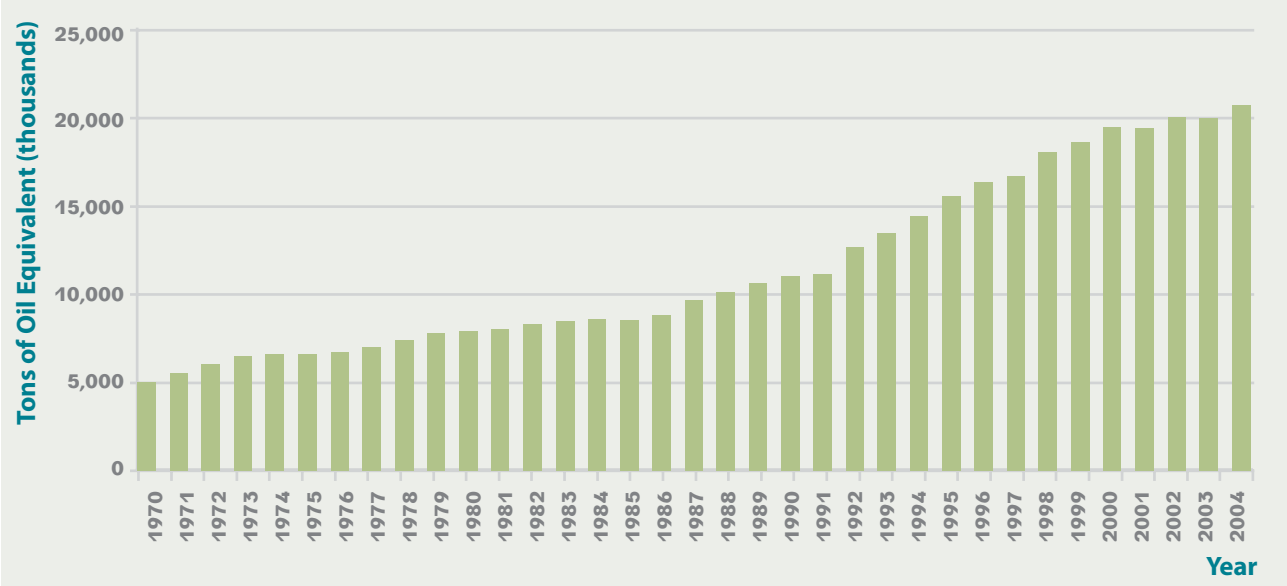
7. Energy Consumption

Energy is the driving force of the economic production system in every modern economy. A rise in energy consumption is an indicator of economic development and growth. However, increased energy consumption also has a negative external effect. It is associated with environmental deterioration, including greenhouse gas emissions, air pollution and natural resources depletion. The major challenge of sustainable development is to enable economic growth through gains in energy efficiency, by means of such measures as conservation.

Primary energy supply in Israel rose from 5,000 thousand tons of oil equivalent (TOE) in 1970 to 20,000 in 2004, an annual increase of 4.16%. During the same period Israel's population grew from 3 million to 6.9 million – an average annual increase of 2.48%. Thus the average increase in energy consumption per capita rose from 1.7 TOE in 1970 to 3 TOE in 2004, an average annual rise of 2%.

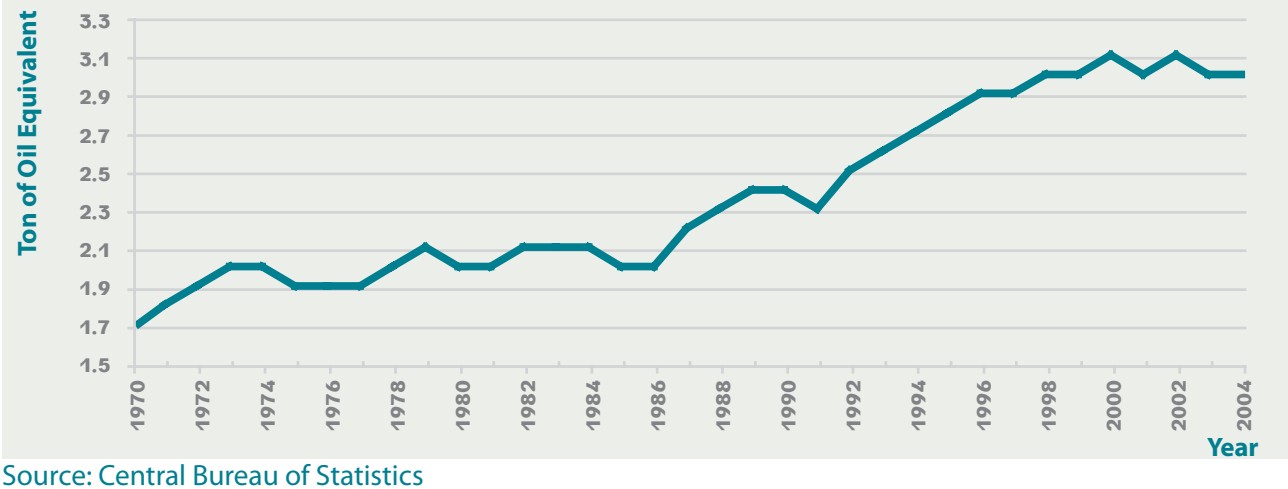
Energy consumption is associated with increased use of non-renewable materials which diminish the natural resources available to future generations. It also creates byproducts with negative external impacts – air pollution, greenhouse gas emissions – that threaten to damage the quality of life of future generations. Increased energy use is responsible for a rise in energy prices and is unequally divided among the different segments of the population. In addition energy consumption which is based on fossil fuels increases Israel's dependence on imports and increases the national external debt, thus imposing an economic burden on future generations.

Figure 9: Primary Energy Supply in Israel in 1970-2004



Source: Central Bureau of Statistics

Figure 10 : Energy Consumption per Capita in Israel in 1970-2004



Source: Central Bureau of Statistics

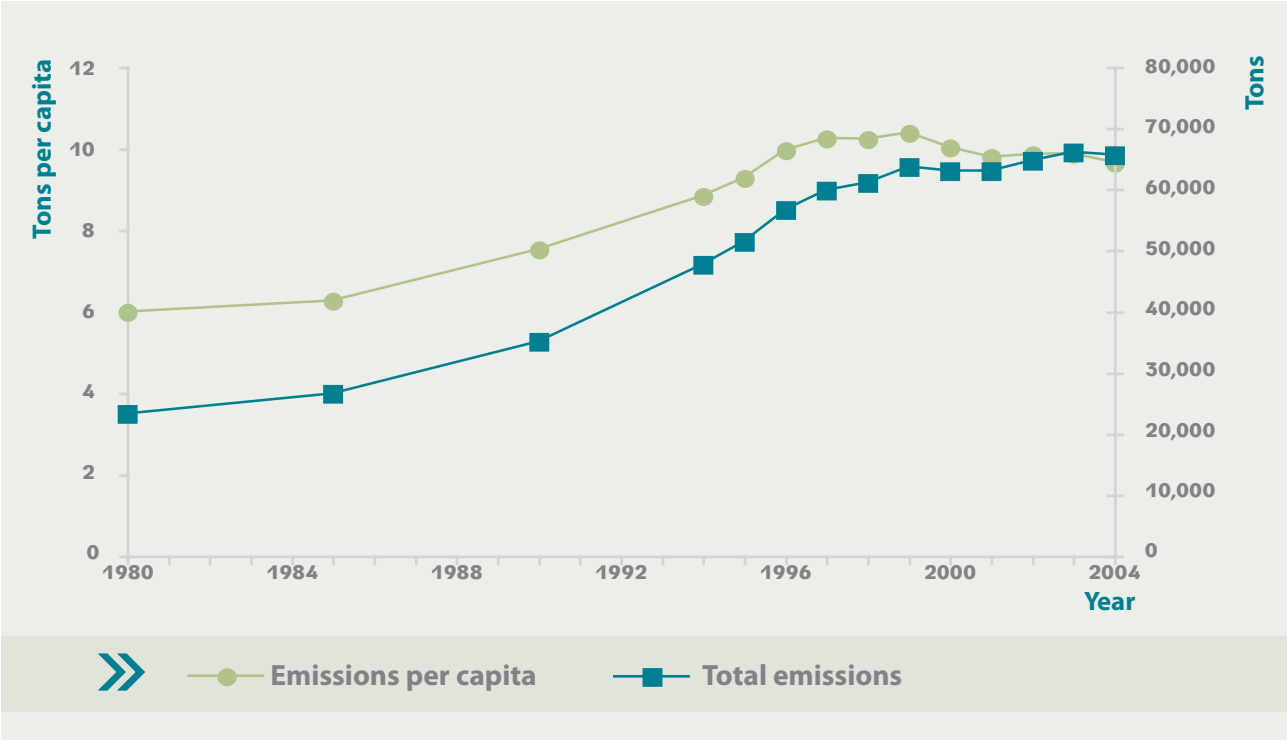
8. CO_2 Emissions

Scientists have linked global warming and climate change to an increase in greenhouse gases in the atmosphere, and especially to an increase in carbon dioxide (CO_2) concentrations. Global warming is now considered to be the primary environmental hazard, with impacts on both the economy and society. This indicator measures the level of CO_2 emissions per capita in Israel.

Total emissions of CO_2 in Israel in 2003 were 63, 729 tons, a 4% rise compared to 2000 and a 23% increase from 1996. Emissions from fuel combustion account for 97% of the total emissions. CO_2 emissions per capita in Israel in the years 1996, 2000 and 2003 were 9.12, 9.7 and 9.53 tons respectively. These statistics demonstrate a rise of 6% from 1996 to 2000 and a decline of 2% from 2000 to 2003. A sharp increase in CO_2 emissions was recorded in Israel in recent decades, which has been moderated since 1997. A similar trend characterized emissions per capita, with a moderate decline since 1999, reaching about 10 tons per capita in 2004.

While Israel's contribution to total global emissions is small, its emissions per capita rank it relatively high among many developed Western countries. On the assumption that Israel's economic growth will continue in coming years, under a business as usual scenario, energy demand will concomitantly rise bringing in its wake increases in CO_2 emissions. This rise will continue as long as Israel uses fossil fuels for energy production and transportation. A switch to natural gas use for electricity production and transportation, along with renewable energy development, energy efficiency and conservation, may moderate or even reverse the trend of increasing levels of CO_2 emissions per capita.

Figure 11: CO_2 Emissions from Fuel Combustion – Total and per Capita Emissions



Source: Central Bureau of Statistics and Air Quality Division, Ministry of Environmental Protection

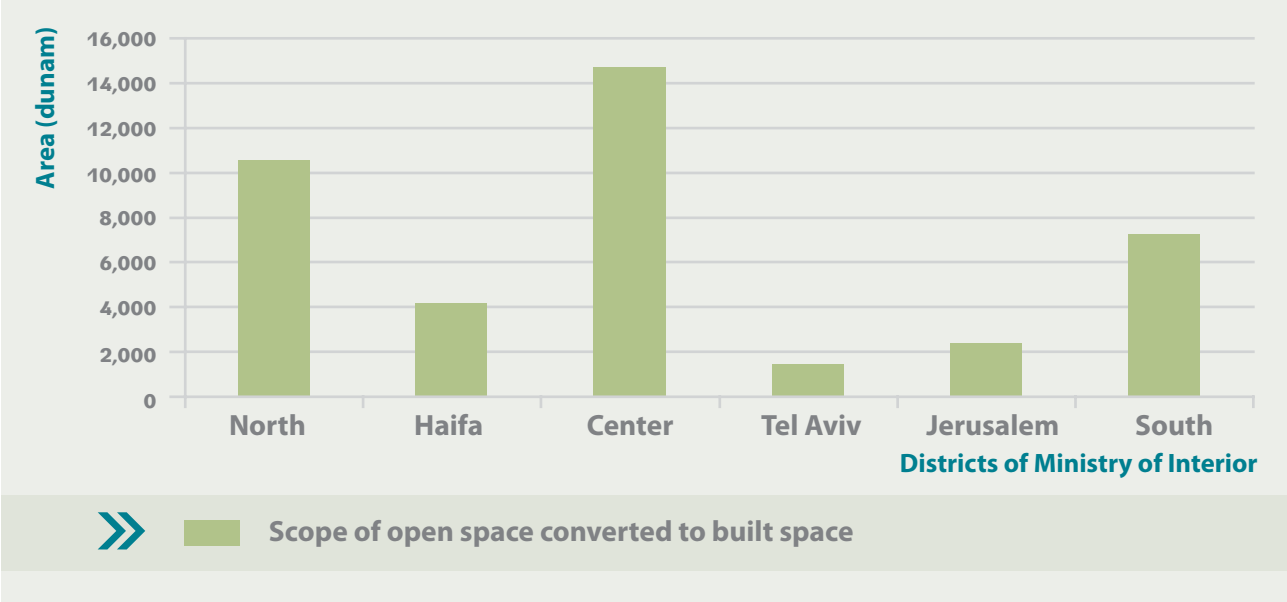
9. Open Space per District

Open spaces include natural, landscape and heritage values and serve as green lungs and recreation and leisure areas for Israel's population. Development pressures have reduced the quantity and quality of open spaces in Israel.

In the five year period between1998-2003, the largest area of open space was detracted from the three districts which are characterized by the widest open expanses in Israel: the Central, Northern and Southern Districts. In the remaining districts, Haifa, Tel Aviv and Jerusalem (which are more metropolitan in character), the open space area converted to built-up area was relatively limited. The largest area of open space to be converted to built-up space was in the Central District due to growing demand for building and the growth of suburbanization processes in the vicinity of the Tel Aviv metropolitan area.

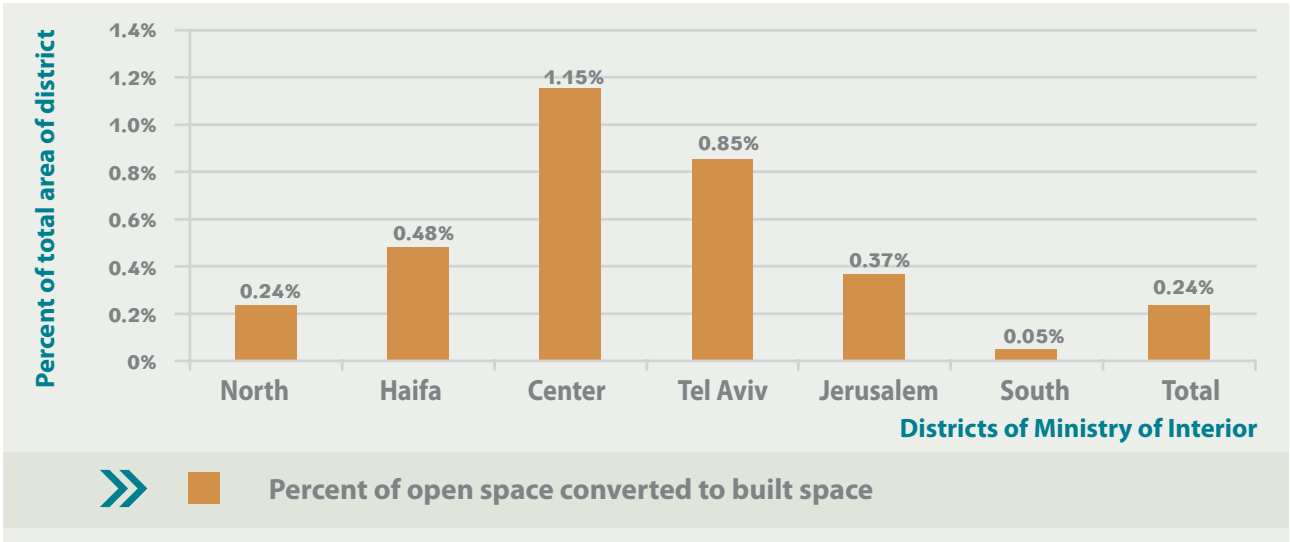
A decrease in the scope of open space threatens ecosystems, environmental health and the public's right to enjoy natural, landscape and heritage assets.

Figure 12: Scope of Open Space (Dunam) Converted to Built Area in Each District between 1998-2003



Source: Moti Kaplan – Regional and Environmental Planning

Figure 13: Percent of Open Space Converted to Built Space out of the Total District Area between 1998-2003



Source: Moti Kaplan – Regional and Environmental Planning

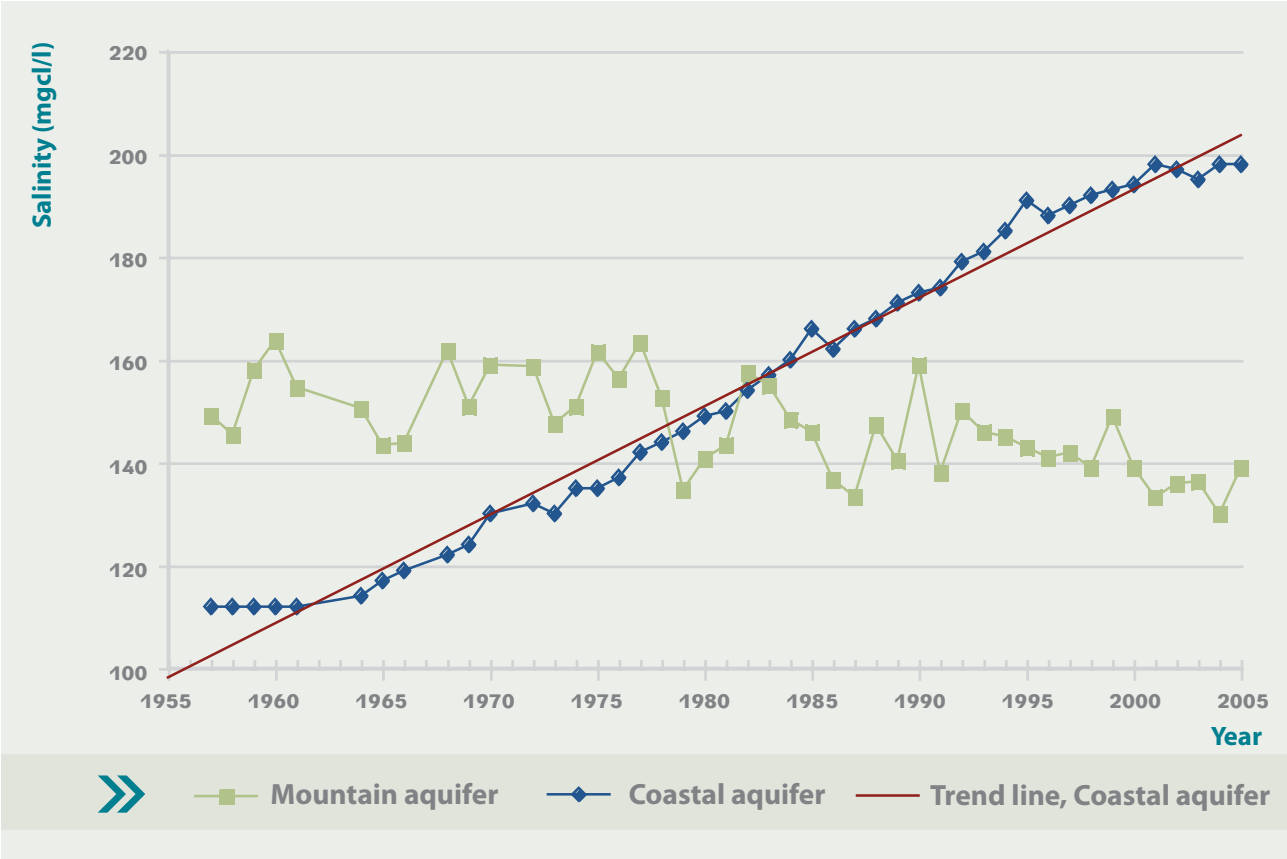
10. Salinity of Groundwater in the Coastal Aquifer and Mountain Aquifer

Salinity of groundwater indicates the quality of groundwater and reveals the state of Israel's main groundwater reservoirs. The indicator provides information about these water resources and their changes over time as a function of water resource management – including pumping, infiltration to groundwater and land use above aquifers.

There is no clear trend of change in water salinity in the mountain aquifer and average chloride concentrations range between 130-164 mg/l. In the coastal aquifer a clear trend of increased salinity has been recorded, with an average increase of 2 mg/l a year, from 112 mg/l in 1957 to 198 mg/l in 2005.

Water salinity increases due to the lowering of water levels and reduction of drainage to sea, the infiltration of water which is more saline than the natural replenishment water, the use of fertilizers and pollutant accumulation in the soil and the range of activities which recycle water and bring about the increased salinity of irrigation waters and salt accumulation in the soil. Salinity, therefore, reduces the volume of renewable water which is at the disposal of the population and damages sensitive agricultural crops.

Figure 14: Salinity of the Coastal Aquifer and the Mountain Aquifer, 1957-2005



Source: Israel Water Authority