

INTRODUCTION TO THE TABLES

1. GEOPHYSICAL CHARACTERISTICS

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AREA

(Table 1.1)

DEFINITIONS AND EXPLANATIONS

Israel is located on the south-western edge of Asia, east of the Mediterranean Sea. The Lebanon and Anti-Lebanon Mountains are to the north, the Syrian and Arabian Deserts are to the East, and the Sinai Peninsula and the Gulf of Elat are to the south.

State of Israel area: the land area and area of the lakes – Sea of Galilee and the Dead Sea (incl. the southern basin of the Dead Sea). Since 1967, including East Jerusalem, and since 1982 including the Golan. The area data relate to districts, sub-districts, natural regions, and lakes. On 26 October 1994, the peace agreement between Israel and Jordan was signed. As a result, in 1995 territories were exchanged in the Southern Arava and in the Bet She'an Valley.

As of the 1995 Census, the measurement of areas has been computerized, and is performed by the Geographic Information System (GIS).

District and Sub-District: The districts and sub-districts are defined according to the official administrative division of Israel, which includes 6 districts and 15 sub-districts. Including Israeli localities in the Judea and Samaria Area.

The areas of districts and sub-districts are updated on the basis of border adjustments performed periodically by the Planning administration.

Natural region: Natural regions are continuous areas, as uniform as possible, both in terms of physical structure, climate, and land, and in terms of the demographic, economic, and social characteristics of the population.

A natural region can be part of one sub-district or, in some cases, an entire sub-district (see the Map of Israel - Districts, Sub-districts and Natural Regions).

In the 2008 Census the division into natural regions was updated, and their number rose from 50 (in the 1995 Census) to 51.

CLIMATE

(Tables 1.2-1.6)

DEFINITIONS AND EXPLANATIONS

Israel's geographic location, between Latitudes north 29°30' - 33°20', Longitude 35°30', east of Greenwich, makes it a subtropical region, which is a transitional area between the temperate zone and the arid zone.

Israel, therefore, is on a "climatic crossroads": its southern and eastern areas are characterized by an arid climate, while the rest of its areas are characterized by a Mediterranean climate. One of the main characteristics of this kind of climatic formation is the high variability in quantities of precipitation from year to year and between different areas. The summer is hot with hardly any rain, and the winter is cool and rainy.

Daily maximum temperature: The monthly average of daily maximum temperatures.

Daily minimum temperature: The monthly average of daily minimum temperatures.

Precipitation: Water particles in a liquid or solid state, which fall from a cloud and reach the surface of the earth. In Israel, most precipitation is in a liquid state (rain), but can also be in a solid state (hail or snow). The amount of precipitation is measured by a rain gauge, whose inner area is 200 cm., and which is positioned parallel to the ground. In a manual rain gauge, rain accumulates in a collector. The quantity of rain is defined in terms of height in millimeters, and is measured in a graduated cylinder. In Israel, there are hundreds of rain stations, and most of them are manned stations. The multi-annual averages are based on these measures. In recent years, automated rain gauges have also been used, and the use of these instruments is increasing.

The rainy season in Israel usually begins in October and ends in May of the next year. Precipitation data are presented for rain years, i.e., from August to July of the next year.

Relative humidity: The ratio (in percentages) of the amount of vapour in the air at a certain temperature to the amount of vapour that the air can contain in a state of saturation at the same temperature. Temperature data and relative humidity are presented by calendar years (January to December).

Global radiation: The flux of solar short-wave radiation in wave lengths of 0.3-3.0 microns (ultra-violet up to infra-red), which reaches the ground directly from the sun disc (direct radiation) and indirectly (diffuse radiation) from the sky.

Measurements of the flux of radiation are made using a pyranometer. The measurement units for flux of radiation are watts per square meter. However, average measurements are presented in the table in cumulative values by energy units - mega-joules per square meter.

Duration of solar radiation: the amount of time the sun shines directly in a given location.

SOURCE OF THE DATA AND METHODS OF COMPUTATION

Data on average precipitation have been standardized and adjusted to the standard period from 1981 to 2010.

The multi-annual averages of number of rain days relate to the period from 1981 to 2010, and present days with at least 1 mm. of rainfall per day.

Multi-annual averages of temperature were updated, and they refer to the period from 1995 to 2009. Multi-annual averages of relative humidity refer to the period from 1981 to 2000, except for Haifa (Technion), where the averages were updated to the period 1995-2009.

The division into regions in the tables has been adapted to the division into geoclimatic regions of the Meteorological Service.

Temperature: At all of the stations, data were obtained from automated stations. The multi-year averages are for 1995-2009, and are based primarily on the averages from the automated stations – except for Tel Aviv, where the data were taken from the Tel Aviv (Coast) Station, but the averages were obtained from the manned station at Sede Dov.

In Haifa, the Haifa (Technion) Station has replaced the Haifa Bay Station. The multi-year averages are also based on Haifa (Technion) data. The Sede Boqer Station has replaced the Mizpe Ramon Station.

Precipitation: At most of the stations, the data are from manned stations, and the multi-year averages are updated to 1981-2010 – except for Be'er Sheva, where the data are from the automated station and the averages were calculated on the basis of the manned and automated stations.

In most of the places, the rain monitoring stations were situated at the same locations as the stations that monitored temperature and relative humidity, except in following cases:

In Haifa, the rain monitoring station is at the Haifa Port, whereas temperature and relative humidity are measured at the Technion.

In Tel Aviv, the rain monitoring station is at HaKefar HaYarok, whereas temperature and relative humidity are measured at the Tel Aviv (Coast) Station.

In Emeq Yizre'el, the rain monitoring station is at Kefar Yehoshua, whereas temperature and relative humidity are measured at Nir Haemeq.

In all of the above cases, the multi-year averages were obtained from the same rain monitoring station, for the period 1981-2010.

Relative humidity: In all the stations, the data are based on measurements from automated stations. However, the multi-year averages still relate to the period from 1981-2000, and are based on manned measurements from those stations. Nonetheless, the following exceptions should be noted:

In the Haifa (Technion) Station and the Sede Boqer Station, the averages have been updated to 1995-2009, and are based on measurements from that station. In the Tel Aviv (Coast) Station, the averages were taken from the Sede Dov Station; in the Nir Haemeq Station, the data are from the Kefar Yehoshua Station; in Be'er Sheva, the averages were taken from the Be'er Sheva (West) Station; and in Sede Eliyyahu, the averages were taken from the Tirat Zvi Station.

Climate data are received from the Meteorological Service at Bet Dagan.

NAME OF STATION, GEOGRAPHICAL LOCATION AND RELATIVE ALTITUDE

COASTAL REGION

Haifa (Technion): 35⁰02'E; 32⁰77'N; 245 m.

Haifa (Port): 34⁰99'E; 32⁰82'N; 12 m.

Tel Aviv (Coast): 34⁰75'E; 32⁰05'N; 10 m.

Tel Aviv (Kefar HaYaroq): 34⁰82'E; 32⁰12'N; 40 m.

Bet Dagan (meteorological station): 34⁰81'E; 32⁰00'N; 31 m.

Negba: 34⁰67'E; 31⁰65'N; 92 m.

HILL REGION

Har Kena'an: 35⁰50'E; 32⁰98'N; 934 m.

Even Yizhaq (Gal'ed) 35⁰07'E; 32⁰55'N; 185 m.

Jerusalem (Center): 35⁰22'E; 31⁰78'N; 815 m.

Jerusalem (Givat Ram): 35⁰19'E; 31⁰77'N;
775 m.

NORTHERN VALLEYS

Kefar Blum: 35⁰61'E; 33⁰17'N; 75 m.

Kefar Yehoshua: 35⁰15'E; 32⁰67'N; 45 m.

Nir Haemeq: 35⁰27'E; 32⁰59'N; 60 m.

NEGEV REGION

Be'er Sheva (Negev Institute): 34⁰79'E; 31⁰25'N; 280 m.

Be'er Sheva (West): 34⁰70'E; 31⁰24'N; 225 m.

GEOPHYSICAL CHARACTERISTICS (5)

מאפיינים גאופיזיים

Sede Boqer: 34°48'E; 30°52'N; 470 m.

JORDAN RIFT AND ARAVA

Sede Eliyyahu: 35°51'E; 32°43'N; -185 m.

Sedom: 35°39'E; 31°03'N; -390 m.

Elat: 34°95'E; 29°55'N; 20 m.

AIR

Emissions of air pollutants from fuel combustion and concentrations of air pollutants - see Chapter 27 - Environment.

WATER

Water production and consumption, see Chapter 21 - Energy and Water.

Quality of water at the beaches and streams, sewage and effluents, see Chapter 27 - Environment.

GROUND WATER

(Table 1.7)

WATER LEVEL IN AQUIFERS AND SALINITY

The aquifers in Israel are: Coastal Aquifer, Mountain Aquifer, Western Galilee Aquifer, Carmel Aquifer, Sea of Galilee Aquifer, Eastern Hill Aquifer, and Negev and Arava Aquifers. The water level of the aquifers changes according to, among others, run-off entering it and pumping activities carried out.

PRESENTATION OF DATA

The data presented in the table focus on the two main sources of utilizing ground water in Israel: the Mountain Aquifer and Coastal Aquifer.

The table presents specific data on a limited number of drillings (out of hundreds) in accordance with the recommendations of the Hydrological Service.

Water level values were published in relation to Mean Sea Level for the months of: April (Spring), and October (Fall), to indicate maximal and minimal water levels, respectively.

In observation drillings, as in exploratory drills, water is not pumped. Therefore, the water levels measured are more reliable than those derived from active drillings.

Water level values presented in the table are the average measurements in a month.

Salinity values presented in the table are the average measurements taken at different points several times a year.

DEFINITIONS AND EXPLANATIONS

Water level: Height of the water level, in meters above sea level.

Aquifer: A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater.

The main source of water for the aquifer is rainfall and surplus irrigation.

In Israel, there are seven aquifers: The Coastal Aquifer, the Mountain Aquifer (the Yarqon-Tanninim Aquifer), the Western Galilee Aquifer, the Carmel Aquifer, the Sea of Galilee Aquifer, the Eastern Hill Aquifer, and the Negev and Arava Aquifers. The two main aquifers are the Coastal Aquifer and the Mountain Aquifer.

The Mountain Aquifer (the Yarqon-Tanninim Aquifer): An aquifer bordered in the north by the southern slopes of the Carmel Mountain and the Tanninim Stream, in the east - by the ridges of the Judea and Samaria Hills, in the south - by the Be'er Sheva Valley and in the west - by the Mediterranean coast. The main flow of water at the Mountain Aquifer is from the springs of Rosh HaAyin and the springs of the Tanninim Stream.

The Coastal Aquifer: The aquifer spans from the southern foothills of the Carmel mountains in the north to the southern coastal plain in the south. In the east, the aquifer is bordered by the central mountain ridge and in the west by the Mediterranean Sea. In addition to the main source of water for the aquifers (penetration of water from rainfall and surplus irrigation), this aquifer is filled from artificial recharging of flood water and effluents.

Height of drilling: Height of drilling point in meters above sea level.

SOURCE OF THE DATA

The data were obtained from the Hydrological Service.

LIMITATIONS OF THE DATA

If there is no way of measuring the water level during a certain month, there are methods of interpolation and imputation of data from neighbouring drillings. In addition, a hydrological model is used to complete the data. (This adjustment is carried out by the Hydrological Service in a small percentage of the measurements).

Drillings are occasionally closed and replaced with a nearby drilling. In such cases, the data cannot be compared to previous years.

SURFACE WATER

(Table 1.8)

Water Level of the Sea of Galilee and the Dead Sea and Water Salinity in the Sea of Galilee

The Sea of Galilee serves as the largest surface water reservoir in Israel. Information on its water level is therefore essential as it indicates the situation of the water reserves of the country.

Diversion of water to the National Water Carrier has a strong impact on the water level of the Dead Sea.

Information on the water level of the Sea of Galilee and the Dead Sea in these time series may provide an indication of short-term as well as long-term problems. These series constitute a basis for understanding the physical processes and environmental changes resulting from human intervention in the ecosystem. In addition, the time series provide important information on natural fluctuations of water. There is no Israeli standard yet for the quality of the Sea of Galilee and Dead Sea water.

PRESENTATION OF DATA

All the water level values appear with a minus sign, since the height of Sea of Galilee and the Dead Sea are below sea level.

Using the recommendations of the Hydrological Service, May and November measurements for Sea of Galilee are published as well as May and December measurements for the Dead Sea.

Data of the Spring (May) indicate the maximum water level for a given year, whereas data of the Fall months (November, December) indicate the minimal water level. The value presented in the table is the result of the first measurement of that month.

As of 1969, all salinity tests have been carried out at one sampling point in the center of the Sea of Galilee, which constitutes a representative point of the average salinity of the Sea of Galilee.

DEFINITIONS AND EXPLANATIONS

Water salinity: The concentration of chlorides (Cl) in water. Water salinity is an important parameter in determining possible uses of water. It is measured by milligrams of chlorides per liter of water (mg/l).

According to its salinity, the quality of water is determined by the following categories:

Cl (mg/liter)	Water Type
$Cl \leq 600$	Fresh water
$400 < Cl \leq 4,000$	Brackish water
$400 \leq Cl < 6,000$	"Grey" area
$Cl > 4,000$	Saline water

SOURCE OF THE DATA AND METHODS OF COMPUTATION

Data on the water level in the Sea of Galilee and the Dead Sea were obtained from the Hydrological Service. Data on the salinity of the Sea of Galilee were obtained from the Hydrological Service for the years 1960-1968 and 1992-2013, and from the Kinneret Limnological Laboratory (Nishri et al.) for the years 1969-1991.

The statistical parameters of salinity are calculated out of a series of observations.

An observation is the weighted average of salinity levels measured at a number of permanent depths in the Sea of Galilee.

LIMITATIONS OF THE DATA

If no measurement was taken during a certain month, hydrologists at the Hydrological Service use "nearest neighbour" imputation methods or other accepted models to fill in the missing data. These models take into account seasonal and hydrological information that has accumulated over the years.

In the absence of a salinity measurement in one of the permanent depths from which an observation is calculated during the years 1969-1991, the CBS uses an imputation of a datum, which is the average of measurements at the same depth and in the same month for 3 consecutive years. In certain instances, the datum of the measurement was imputed on the same date.