



Prime Minister Office

# Regional Population Scenarios for the State of Israel 2015-2040

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**Dror Shvadron**  
**Shmuel Abramzon**

המועצה הלאומית לכלכלה  
משרד ראש הממשלה



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## Opening Statement by the Head of the National Economic Council

Demography is one of the most significant factors in shaping the economy and society. The size and composition of Israel's population in 2040 will likely be very different from its current population, as the result of high and varied birth rates in different population groups and the increase in life expectancy.

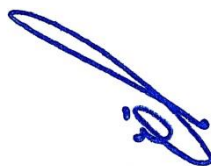
Added to this is the significant dimension of regional population distribution. The demographic composition in each of the districts and sub-districts of Israel is also expected to change. This is not only the result of national trends, but also because of unique local characteristics and migration trends between regions, and specifically migration to metropolitan areas and the center of the country.

The government, the private sector and the public in general must prepare for these expected changes, find a way to take advantage of opportunities, and to tackle the challenges therein. The central step of the effort requires shared understanding of the expected demographic future. This understanding will help to measure the impact in various fields in the future, including in employment, education, health, social services, etc.

To this end, it is our privilege to present this overview of these demographic scenarios, divided according to districts and sub-districts, which was formulated by the National Economic Council based on national projections calculated by the Central Bureau of Statistics and on the Strategic Housing Plan, which was approved by the government in March 2017. I hope that this paper will serve as a basis for improving all aspects of socioeconomic planning in Israel, particularly at the regional level, thereby helping ensure a continued high quality of life for us and our children.

I thank Dr. Shmuel Abramzon and Dror Shvadron for the professional work in preparing the report, and all those who played a part in these efforts.

Sincerely,



Prof. Avi Simhon  
Head of the National Economic Council

## **Regional Population Scenarios for the State of Israel, 2015–2040**

### **Executive Summary**

This paper presents regional population scenarios for Israel for the years 2015–2040. The figures are based on a model that was developed by the National Economic Council (NEC) at the Prime Minister’s Office of Israel, in collaboration with the Israeli Central Bureau of Statistics (CBS), and with the assistance of Israeli demographers. The purpose of this work is to create a shared tool that supports governmental and non-governmental agencies, as well as the general public, in strategic and long-term planning that depends on understanding Israel’s future regional population distribution.

The work presents six scenarios that provide possible distributions of the population in each of Israel’s 16 sub-districts (including Judea and Samaria) for the 25 years between 2015 and 2040. The population in each sub-district is divided into five-year age groups and by gender, and into three main subgroups: non-Haredi Jews and others, Haredi Jews and Arabs (including other minorities). One of the six scenarios, the one based on medium-level fertility and mortality rates, as well as internal migration levels that follow the government’s Strategic Housing Plan, is designated to serve as the central scenario.

The work is based on a cohort component model that starts with Israel’s population estimates at the end of 2015. It uses three different sets of fertility and mortality assumptions taken from the National Population Projections produced by the Israeli CBS, with additional adjustments for particular subgroups – religious (non-Haredi) Jews, secular Jews, Christians, Druze and Muslims in each region. International migration assumptions are also taken from the national-level projections. Finally, the model uses two sets of internal migration assumptions. The first is based on historical trends from the past decade (2005–2014). The second set is based on the Strategic Housing Plan approved by the government in March 2017. Assuming that future housing will be constructed in accordance with the strategic plans, the internal migration in the model has been adjusted to represent population migration to regions where new housing is available.

The model’s products are available online on the NEC website, along with data visualization. The work is open-source: all code and data files required for reproducibility are available online for download and use.

## A. Introduction and Purpose of the Paper

Governmental and extra-governmental bodies require estimates of Israel's future population size and composition for long-term strategic thinking and planning. To this end, the CBS publishes long-term national projections, which provide scenarios for a period of 50 years into the future. The current projection encompasses 2015-2065<sup>1</sup>.

National population scenarios provide a response to multiple planning needs and serve as a basis from which one can understand what the country's population is expected to look like in the future. At the same time, regional planning needs necessitate an estimation of future population at the regional level. This is especially true with regard to bodies that provide regional services and are affected by population size in different regions and their unique characteristics. To date, various government bodies have conducted regional estimations on an independent basis, using different methodologies. The lack of a unified evaluation process adversely affects the ability to coordinate government policies, and may lead to wasted resources and inefficiency. The goal of this paper is to create scenarios that are accessible to the entire public, and which can serve as a shared basis for all governmental and extra-governmental planning processes.

This paper presents six different scenarios for Israel's population between the years 2015 and 2040. The population is divided into three groups: non-Haredi Jews and others, Haredi Jews and Arabs (including Druze and Circassians). These groups have very different birth and internal (inter-regional) migration patterns, and therefore their regional demography develops in substantially different ways. For each scenario, the paper presents the population size according to gender and five-year age groups in each of Israel's sub-districts. The six scenarios are based on a combination of assumptions in two dimensions. The first dimension is the result of three sets of assumptions regarding birth rate and mortality rates (high, medium and low), in accordance with the CBS's national assumption. The second dimension is the result of two different approaches to internal migration. The central scenario is based on expected future housing construction, whereas the secondary scenario is based on historic migration trends. As mentioned, the combination of these two dimensions creates six discrete scenarios. For example, "A high scenario based on historic migration trends."

Building demographic scenarios faces objective challenges, some of which are unique to Israel. These challenges include great heterogeneity between different population groups and a high level of international migration. Alongside the national division between Jews and Arab, these two populations are internally divided into unique sub-groups with different demographic characteristics, including different birth and mortality rates. In addition, Israel's small size and population, its high dependence on government planning and construction institutions, uncertainty regarding future international migration trends, and the existence of possible future changes to the borders add many dimensions of uncertainty, making it more difficult to predict the characteristics of Israel's future population.

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<sup>1</sup> Population Projection, Central Bureau of Statistics [in Hebrew]:  
[http://www.cbs.gov.il/reader/?MIval=cw\\_usr\\_view\\_SHTML&ID=811](http://www.cbs.gov.il/reader/?MIval=cw_usr_view_SHTML&ID=811)

Despite these objective challenges, this work is a preliminary attempt to present regional population scenarios, in order to facilitate a more coordinated thought process between the relevant bodies. The model is coordinated with the national projection model published by the CBS, so that the population presented in this paper matches the data published in the national projection. This paper is unique in that it is coordinated with the Strategic Housing Plan approved by the government in March 2017<sup>2</sup>. The main scenario of the model presents internal migration that is influenced by the scope of expected housing construction in various regions across the country, in accordance with the implementation of the housing plan. This allows the work to address a government resolution that charges the National Economic Council with presenting the details of the total population expected in 2040 and its demographic characteristics in each of the districts and sub-districts in Israel.

Intelligent use of the population scenarios requires an understanding of their nature and limitations. **Scenarios are not predictions.** The scenarios are illustrations of a process of growth and change in the population that will occur if the assumptions about future demographic processes are realized throughout the period being examined. Despite not being able to assess with any certainty the chances of the assumption coming to fruition, the benefit in using a set of scenarios as the basis for long-term planning can be great. Although it is difficult to agree on the measure of likelihood of the assumptions of each scenario, it is better to base planning on formulated scenarios coordinated by all the parties in the system, while recognizing the set of assumptions they are based on.

Recognizing the practical need to create a unified reference point for all planning systems in Israel, we chose to define **one central scenario** – the scenario that adopts the CBS's assumptions for medium birth and mortality rates in Israel, and that assumes internal migration that matches the Strategic Housing Plan approved by the government. However, it is possible that other scenarios will be just as relevant. Specifically, when it comes to long-term planning, the higher and lower scenarios should also be taken into consideration, as they may serve as reasonable boundaries for future population size and composition.

This document presents a basic survey of the model's various assumptions, and allows for a preliminary understanding of its various components.

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<sup>2</sup> Ofer Raz-Dror and Noam Kost, *Strategic Housing Plan for 2017 to 2040*, National Economic Council, May 2017 [in Hebrew].  
<http://economy.pmo.gov.il/councilactivity/housing/documents/strategy050717.pdf>.

## **B. Methodology and Scenario Assumptions**

### **1. Overall Model**

The population scenarios are based on a cohort component model. The model has one input for population size for a base year (2015), assumptions regarding future birth and mortality rates, and assumptions on internal and international migration. Using this data, the model calculates the population size expected in a predetermined future period. Some of the model's assumptions in this work are based on the assumption of the CBS forecast for 2065, while others are based on current data that has been specially gathered and analyzed. The decision which assumptions to use derives from the balance between two extremes. On the one hand, there is a desire to present the population in Israel as faithfully as possible, with all its diversity and complexity; on the other hand, the limited availability of data and its limited accuracy regarding the estimations restricts the ability to represent small population groups. For example, the CBS's national projections defined three population groups – non-Haredi Jews and others, Haredi Jews, and Arabs. The move to regional scenarios requires dealing with the unique characteristics of other sub-groups, specifically the size of the population and birth rates of the Bedouin in the south and Christian Arabs, and a distinction between religious and secular Jews. These distinctions result from the recognition that the characteristics of the geographic distribution of these sub-groups significantly impact the accuracy of the model's outcomes. However, although the model addresses these issues, the publication does not include this subdivision, but rather is adapted for the same population groups as in the national projection structure.

The data from 2015, together with birth rates, mortality rates and migration assumptions, allow us to calculate an estimated population size during the subsequent period (in our case, 2020). During the first stage, the model calculates the aging of the population, combined with mortality rates per age. In the next stage, births are calculated using birth rates. Later on, population movement calculations are made according to migration trends and the adaptation to the housing plan. Finally, the result is made compatible to the CBS's national data. Similarly, the data for the next period (2020) serves as the basis for the estimation for the period following that (2025), and so on. The model is conducted for a range of 25 years, i.e. it ends in 2040. The decision not to continue the scenario beyond this time period, as is customary in other countries around the world, is the result of the high uncertainty regarding inter-regional migration trends in later time periods.

### **2. Base Population**

The population that serves as the basis for this model is the estimated civilian population size in the State of Israel at the end of 2015 (including Arabs from East Jerusalem), whereas the population's distribution in sub-districts is based on data from 2014. The population is divided into six groups distinguished by religion/level of religiosity, and in some cases there are different assumptions within groups in different regions in Israel. The model divides the Jewish population into three groups: Haredi, religious and secular. The secular Jewish group is joined by a population group defined by

the CBS as “other,” which includes individuals who are not placed into other distribution categories. The Arab population is divided by religion, into Muslims and Christians, and the Druze and Circassians are counted with them. In addition, the different population groups are divided by age and gender. Unlike the CBS projections for 2065, the distribution by age is done in five year groups, beginning with ages 0–4 through the age group 80+ (in accordance with previous CBS projections). This is done because of the limitations of data in certain cases.

In order to divide the Jewish population according to level of religiosity, data from an analysis of Social Surveys conducted by the CBS are used. This data includes a component of self-definition of level of religiosity. The Social Surveys are a source of the most reliable data currently in existence, and allow for a distribution of this sort, although their use is not free from limitations. Specifically, because of the sample size of the surveys, when building the model, it was necessary to assume that the age distribution of a certain group is identical between sub-districts of the same district. For example, the model assumes that the age distribution of Haredi Jews in the Safed sub-district is identical to the age distribution of Haredi Jews in the Acre sub-district because both the sub-districts belong to the Northern District. In the case of the Arab population, the source of data is the data from the Ministry of Interior for 2014, which is official population data. Therefore there was no need to use estimations of the type described above. Accordingly, the level of accuracy of this data is higher than the internal distribution of Jewish population groups.

### **3. Regional Distribution**

The model is meant to serve as a tool in planning long-term policy for the State of Israel. In accordance with the needs that were raised by the planning bodies, the model estimates the future population size of Israel, divided into 16 sub-districts, including Judea and Samaria<sup>3</sup>. Following is the list of sub-districts:

- Northern District: Golan Heights sub-district, Safed sub-district, Acre sub-district, Kinneret sub-district and Jezreel sub-district
- Haifa District: Haifa sub-district and Hadera sub-district
- Central District: Ramla sub-district, Sharon sub-district, Petach Tikva sub-district and Rehovot sub-district
- Tel Aviv District: Tel Aviv-Jaffa sub-district
- Jerusalem District: Jerusalem sub-district
- Southern District: Ashkelon sub-district and Beer Sheba sub-district
- Judea and Samaria<sup>4</sup>

### **4. Assumptions on Fertility Components**

Assumptions related to fertility are a key element of uncertainty in the model. Birth rate patterns are affected by a range of social and economic processes, which change in ways that cannot be predicted with any certainty, and inferences about future trends cannot necessarily be made based on past data. Changes in government benefits,

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<sup>3</sup> The distribution into sub-districts is according to the Ministry of Interior and data from CBS.

<sup>4</sup> Jewish population only.



culture, lifestyle and aspects of employment and livelihood are only some of the factors that can influence the future birth rate. Accordingly, variations and changes in birth rate trends over recent decades point to a difficulty in predicting these trends. Therefore, it is an accepted practice in the field of population projection to conduct a survey among demography experts regarding their positions on future fertility trends.

In this paper, we decided to base our work on fertility assumptions made in recent projections published by the CBS for 2065, while making a number of adjustments and updates in order to take into account characteristics of the relevant sub-groups. In this manner, assumptions for the remaining population groups were combined, i.e. the distinction between religious Jews and secular Jews and the distinction between Arabs of different religions. In addition, an examination of the fertility levels of the Muslim populations of different geographic regions was included. These assumptions are detailed in the chart in Table 1. The adjustments for different population groups were made by calculating the ratio between current fertility rates of the general population group and that of the narrower group, and applying the ratio on the assumptions of future trends<sup>5</sup>.

**Table 1 – Assumptions on Total Fertility Rate (TFR)  
According to Population Group**

Scenario	Year	Secular Jews and Others	Religious Jews	Haredi Jews	Muslim Arabs	Christian Arabs	Druze
	2014	2.14	4.22	6.91	3.35	2.27	2.2
<b>Low</b>	2016-2020	2.15	4.25	6.16	3.04	2.04	2.00
	2021-2025	2.09	4.13	5.73	2.78	1.87	1.83
	2026-2030	2.04	4.02	5.36	2.58	1.73	1.70
	2031-2035	1.96	3.87	5.02	2.42	1.62	1.59
	2036-2040	1.90	3.74	4.71	2.27	1.53	1.49
	<b>Medium</b>	2016-2020	2.28	4.50	6.71	3.22	2.16
2021-2025		2.31	4.55	6.63	3.07	2.06	2.02
2026-2030		2.31	4.55	6.51	2.94	1.98	1.93
2031-2035		2.29	4.51	6.37	2.84	1.91	1.87
2036-2040		2.25	4.44	6.23	2.76	1.85	1.81
<b>High</b>	2016-2020	2.41	4.75	7.25	3.40	2.28	2.23
	2021-2025	2.53	4.98	7.55	3.36	2.25	2.21
	2026-2030	2.58	5.10	7.69	3.31	2.22	2.17
	2031-2035	2.61	5.14	7.74	3.27	2.20	2.15
	2036-2040	2.61	5.15	7.78	3.24	2.18	2.13

In addition to differentiating between the different groups, the current model also differentiates between the birth rates of Muslim women in different regions of the country. This distinction was made because of the high heterogeneity in the birth rates and the difference between the birth rate of Muslims who live in the south (Bedouins in the south) and the Muslim populations in the other regions of the country. Like in the previous distribution, the current fertility data of the Muslim population in Israel was also

<sup>5</sup> Ahmad Hlhel, *Fertility among Jewish Women in Israel, by Level of Religiosity, 1979–2014*, Central Bureau of Statistics (2016).

examined according to sub-district (according to data from 2014)<sup>6</sup>. The current differences helped produce an adjustment factor to be applied to the assumptions about future trends. Table 2 details the differences in TFR of Muslim populations from the different districts, with the adjustment factor applied to the assumptions about future trends.

**Table 2 – Assumptions on Total Fertility Rate (TFR) of Muslims According to District**

Scenario	Year	National Average	Jerusalem District	Northern District	Haifa District	Central District	Tel Aviv District	Southern District
	2014	3.35	3.4	2.78	2.77	3.24	2.79	5.46
Adjustment factor		1.0	1.01	0.83	0.83	0.97	0.83	1.63
<b>Low</b>	2020	3.04	3.07	2.52	2.52	2.95	2.52	4.96
	2025	2.78	2.81	2.31	2.31	2.70	2.31	4.53
	2030	2.58	2.61	2.14	2.14	2.50	2.14	4.21
	2035	2.42	2.44	2.01	2.01	2.35	2.01	3.94
	2040	2.27	2.29	1.88	1.88	2.20	1.88	3.70
<b>Medium</b>	2020	3.22	3.25	2.67	2.67	3.12	2.67	5.25
	2025	3.07	3.10	2.55	2.55	2.98	2.55	5.00
	2030	2.94	2.97	2.44	2.44	2.85	2.44	4.79
	2035	2.84	2.87	2.36	2.36	2.75	2.36	4.63
	2040	2.76	2.79	2.29	2.29	2.68	2.29	4.50
<b>High</b>	2020	3.40	3.43	2.82	2.82	3.30	2.82	5.54
	2025	3.36	3.39	2.79	2.79	3.26	2.79	5.48
	2030	3.31	3.34	2.75	2.75	3.21	2.75	5.40
	2035	3.27	3.30	2.71	2.71	3.17	2.71	5.33
	2040	3.24	3.27	2.69	2.69	3.14	2.69	5.28

In order to calculate the number of births in each period throughout the scenario, the fertility assumptions were combined with birth assumptions for age-specific fertility rates (ASFR). These assumptions are based on data from the last several years, as published in the CBS's Statistical Abstract of Israel, as well as the work of Dr. Ahmad Hliheli regarding the fertility levels of Jewish women according to level of religiosity<sup>7</sup>. Additional assumptions regarding the ratio of gender at birth were integrated, as well as infant mortality rates and mortality rates of women of child-bearing age. The fertility assumptions according to age group are detailed in Table 3.

<sup>6</sup> Central Bureau of Statistics, 3.11 – Live Births, Deaths and Infant Deaths, by District and Sub-District, Population Group and Religion, from "The Statistical Abstract of Israel 2015."

<sup>7</sup> Central Bureau of Statistics, 3.14 – Fertility Rates, Average Age of Mother and Sex Ratio at Birth, by Selected Characteristics of the Mother, from "The Statistical Abstract of Israel 2015."

Ahmad Hliheli, *Fertility among Jewish Women in Israel, by Level of Religiosity, 1979–2014*, Central Bureau of Statistics (2016).

**Table 3 – Distribution of Annual Birth Rates  
According to Age-Specific Fertility Rates**

Age Group	Secular Jews and Others	Religious Jews	Haredi Jews	Muslim Arabs	Christian Arabs	Druze
15-19	0.0%	0.0%	3.3%	4.5%	0.8%	2.0%
20-24	2.9%	15.7%	21.4%	27.3%	15.5%	23.3%
25-29	22.6%	29.9%	25.4%	31.4%	38.1%	36.1%
30-34	40.9%	27.1%	22.6%	22.2%	29.1%	24.5%
35-39	25.9%	20.7%	17.7%	11.4%	13.4%	11.4%
40-44	6.7%	6.3%	8.8%	3.0%	2.7%	2.5%
44-49	1.1%	0.3%	0.8%	0.2%	0.4%	0.1%
	100%	100%	100%	100%	100%	100%

## 5. Assumptions on Mortality Components

The assumptions regarding future mortality rates and life expectancy are based entirely on the CBS assumptions in their long-term projection for 2065. Unlike the birth rate assumptions, no distinction was made between the religious groups or sub-districts. In other words, the mortality assumptions for Jews in the CBS projection were applied to all Jews in this paper. Similarly, mortality assumptions for Arabs were applied to all the Arab groups in this paper. A summary of these assumptions can be found in Table 4, which presents life expectancy at birth in the years of the various projections.

**Table 4 – Assumptions of Life Expectancy at Birth<sup>8</sup>**

Men	Jews			Arabs		
	Scenario	Low	Medium	High	Low	Medium
2020	80.9	82.0	82.0	77.7	78.8	19.8
2025	81.3	82.9	82.9	78.0	79.6	81.1
2030	81.8	83.8	83.8	78.5	80.5	82.3
2035	82.2	84.6	84.6	79.0	81.3	83.3
2040	82.7	85.4	85.4	79.4	82.0	84.3

Women	Jews			Arabs		
	Scenario	Low	Medium	High	Low	Medium
2020	83.9	85.0	86.0	80.5	81.6	82.6
2025	84.2	85.8	87.4	80.9	82.4	83.9
2030	84.7	86.7	88.5	81.3	83.2	85.0
2035	85.2	87.5	89.6	81.8	84.0	86.0
2040	85.6	88.3	90.6	82.2	84.7	87.0

## 6. Assumptions on Internal Migration Components

A critical component in the population projection model is that of migration. Since the model includes more than one geographical region, movement between the

<sup>8</sup> Data from 2015: Jewish men 80.7; Arab men 76.9; Jewish women 84.5, Arab women 81.1.

regions included therein should be taken into account. This topic is a considerable challenge, as it is difficult to predict future migration trends. Past data provides a partial picture, and there are no expert surveys on the matter. In addition, government policy in Israel with regard to housing construction has a decisive impact on the component of future migration<sup>9</sup>. In order to address this situation, the model includes two scenarios regarding internal migration.

The first scenario is based exclusively on past trends. To that end, all the internal migration movements in Israel over the past decade (2005-2014) were examined. These movements include a division of migration according to population groups, gender, age groups, sub-district of origin and destination sub-district. The source of the data is the address-change registration in the Ministry of Interior. In other words, for each combination of two sub-districts in Israel, the scope of migration was estimated according to age groups for Jews and Arabs separately. Then, this data was used to estimate the migration rate in relation to the size of the population groups in the sub-district of origin (with regard to 2009, the half-way point of the period of estimation). For example, for a population group of a certain age, average annual migration from the Haifa sub-district to the Tel Aviv District was examined, and then divided by the size of the same group in the Haifa sub-district. The result is an annual migration rate from Haifa to Tel Aviv for that same group. For each future period in the scenario, the fixed internal migration rate is used. The migration rates for Jews were applied to the groups of religious and secular Jews (i.e. without Haredi Jews), and the rates of migration for Arabs were applied on all three Arab populations. Summations of internal migration assumptions are presented in Table 5.

Due to the uncertainty regarding future migration of Haredi Jews, it was decided to apply the migration trends of all Jews to this population group, with an adjustment for the Haredi Jews' current demographic distribution. Haredi migration into each sub-district was set as the product of the Jewish migration rate to it from the different sub-districts and a factor that represents the centrality of the sub-district in terms of Haredi residence today. This factor is calculated as the ratio between the percentage of Haredi Jews in the Jewish population in that sub-district and the percentage of Haredi Jews in the entire Jewish population in Israel in 2015<sup>10</sup>. In addition, because of the unique characteristics of the Tel Aviv District, price of land, scarcity of available land and the existing population density in Bnei Brak, it was decided to assume, for the purpose of this model, that Haredi migration to the Tel Aviv District will be zero during the years included in the projection. It should be noted that despite this change, the model predicts an increase in the number of Haredi Jews in the Tel Aviv District at a rate of approximately 85% (in the central scenario), mostly as the result of birth rate and an increase in life expectancy.

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<sup>9</sup> Special attention should be paid to the fact that there is a unique difficulty in predicting migration trends in Haredi society.

<sup>10</sup> For example, according to the model, the percentage of Haredi Jews in the Jewish population in Israel in 2015 was 14.14%, while in the Haifa sub-division, it was 5.46%. The ratio between these two figures is 0.39. Therefore, the migration rates of Haredi Jews from all the sub-districts to the Haifa sub-district are the product of the Jewish internal migration rates multiplied by 0.39.

**Table 5 – Assumptions on Internal Migration**

The table presents summations of the internal migration assumptions for the entire population, as a ratio of annual migration to population size in the district of origin. Exit from and entrance to the same district reflect local changes of address.

	Entry						
	Jerusalem District	Northern District	Haifa District	Central District	Tel Aviv District	Southern District	Judea and Samaria
Exit							
Jerusalem District	0.61%	0.03%	0.05%	0.11%	0.40%	0.11%	0.67%
Northern District	0.10%	0.25%	0.20%	0.07%	0.26%	0.08%	0.06%
Haifa District	0.10%	0.10%	0.74%	0.10%	0.40%	0.09%	0.05%
Central District	0.15%	0.03%	0.09%	0.42%	0.82%	0.15%	0.18%
Tel Aviv District	0.20%	0.04%	0.12%	0.44%	1.88%	0.15%	0.13%
Southern District	0.19%	0.03%	0.08%	0.17%	0.47%	0.73%	0.10%
Judea and Samaria	1.11%	0.06%	0.08%	0.25%	0.47%	0.28%	1.24%

The second scenario, **which is the central scenario in the model**, is an addition to the first scenario. This scenario combines the scope of future construction in the framework of the Strategic Housing Plan approved in March 2017 and published in May<sup>11</sup>. It also serves as the National Economic Council's response to Article 6 of the relevant Government Resolution. This scenario considers future construction plans as real construction, and therefore the source of additional housing supply in each sub-district.

In light of this supply, the scope of housing demand is calculated, including internal migration as calculated in the previous scenario. There are often disparities when the supply and demand are compared in the model. These disparities constitute a hypothetical situation in which people move to a region in which there is not enough housing, or there are apartments that remain empty without demand. In order to rectify this situation, an additional stage of internal migration is made to sub-districts in which there is a surplus of housing. This stage is based on the migration component in the first scenario. If there is a surplus of demand at the national level, the leftover population is distributed relative to population size of each sub-district.

<sup>11</sup> Ofer Raz-Dror and Noam Kost, *Strategic Housing Plan for 2017 to 2040*, National Economic Council, May 2017 [in Hebrew].

<http://economy.pmo.gov.il/councilactivity/housing/documents/strategy050717.pdf>.

Government Resolution No. 2457 of March 2, 2017 [in Hebrew].

<http://www.pmo.gov.il/Secretary/GovDecisions/2017/Pages/dec2457.aspx>.

It should be noted that currently the Strategic Housing Plan does not include a full distribution at the sub-district level. In order to overcome this gap, an internal estimation regarding the scope of housing planned in the sub-districts was conducted, in accordance with the district plan. As soon as the planning targets are determined for the missing sub-districts, the model will be updated accordingly. We expect certain differences in the results of the scenarios, mostly in the sub-districts located in the Central District.

**Table 6 – Future Construction Targets According to the Strategic Housing Plan and the Projected Completion of Construction (Housing Units)**

	<b>2017-2020</b>	<b>2021-2025</b>	<b>2026-2030</b>	<b>2031-2035</b>	<b>2036-2040</b>
<b>Jerusalem District</b>	6,044	6,636	7,302	7,752	7,783
<b>Northern District</b>	9,424	9,924	11,195	11,551	11,687
<b>Haifa District</b>	7,415	5,977	7,114	7,710	8,216
<b>Central District</b>	12,526	13,159	10,920	11,273	11,528
<b>Tel Aviv District</b>	6,664	7,676	9,360	10,463	11,369
<b>Southern District</b>	7,653	9,837	12,755	13,281	13,582
<b>Judea and Samaria</b>	2,041	2,124	2,395	2,545	2,721
<b>Total</b>	<b>51,767</b>	<b>55,333</b>	<b>61,041</b>	<b>64,575</b>	<b>66,886</b>

## **7. Assumptions on International Migration Components**

Similar to the internal migration trends, there is a methodological difficulty regarding international migration when building scenarios about the future. Israel's historic migration includes large waves of immigration that are unlikely to recur, and trends of emigrating from Israel may change as the result of various economic and social processes. The model includes one set of assumptions on the scope of international migration, which distinguishes between positive migration, i.e. immigration to Israel, versus emigration from Israel. This set matches the assumptions used by the CBS in its national projections. The migration distribution is based on data provided by the Ministry of Interior from the past decade (2005-2014), for different population groups, by age, gender and sub-district. A summation of the assumptions is presented in Table 7. After the rates of immigration and emigration were determined in accordance with all the various dimensions, the scope of migration was adjusted to fit the national assumptions.

**Table 7 – Assumptions on International Migration**

<b>District</b>	<b>Non-Haredi Jews and Others</b>	<b>Haredi Jews</b>	<b>Arabs</b>
<b>Immigration (people per year)</b>			
Jerusalem District	4,510	340	140
Northern District	3,260	250	570
Haifa District	2,670	200	270
Central District	5,500	410	220
Tel Aviv District	4,170	310	110
Southern District	4,390	330	50
Judea and Samaria	970	70	-
<b>Total</b>	<b>25,470</b>	<b>1,910</b>	<b>1,360</b>
<b>Emigration (people per year)</b>			
Jerusalem District	630	70	80
Northern District	660	70	100
Haifa District	790	90	40
Central District	1330	150	40
Tel Aviv District	1250	140	10
Southern District	1170	130	20
Judea and Samaria	190	20	-
<b>Total</b>	<b>6,020</b>	<b>670</b>	<b>290</b>

## **8. Adjustment to the National Projections**

When running the model, gaps develop over time between the total population in different regions and the CBS's national projections for 2065. In order to provide a consistent picture, the results have been inflated so that there is a full compatibility of the total national population in both models.

## C. Products

As part of the work conducted, a number of additional products were prepared in order to meet the needs of the various users:

1. **Excel file** – Including a full detailing of the model's results, for three fertility and mortality rate scenarios and two internal migration scenarios. The complete data can be found in this file, alongside tables that allow for easy access to and cross-sectioning of the data, according to geographic regions and age groups.
2. **Interactive Tableau-based website** – The results of the model appear on the website for four scenarios (out of six). These scenarios are the medium birth and mortality rates for past migration trends and the adjustment for the housing plan, as well as two extreme scenarios (high and low) out of the remaining four. The website has an interactive user interface which enables the user to see the results of the models as graphs and tables in different cross-sections.
3. **Source code** – The model that is the basis for this paper was written in the programming language R. The source code used to produce the data, alongside all the assumptions which were used, are available to the public through an open source license. With these files, the user can recreate the results of the model, and study the structure and methods used for the various calculations in depth.

All the products are available in Hebrew on the National Economic Council's website:

<http://economy.pmo.gov.il>

To sign up for our newsletter in Hebrew, to receive updates and messages about any changes, please register at:

<https://survey.gov.il/he/survey/1201>.



## D. Results of the Model

All the results of the model are available to be viewed and analyzed through the additional products of the work, detailed in the previous section of this document. Following is a summation of the results for each sub-district, without detailing the distribution into groups, age and gender:

**Table 8A – Medium Scenario, Adjusted for the Strategic Housing Plan**

	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Jerusalem District	1,060,800	1,173,300	1,289,600	1,409,200	1,529,200	1,649,000
Safed sub-district	115,700	128,300	140,800	156,300	173,000	191,900
Kinneret sub-district	112,600	123,200	134,400	147,800	162,100	177,900
Jezreel sub-district	492,500	534,800	579,100	631,100	685,700	743,800
Acre sub-district	617,800	671,600	726,500	790,500	857,400	927,700
Golan sub-district	47,400	52,900	58,400	64,000	70,100	76,500
Haifa sub-district	570,900	600,200	634,000	679,100	734,900	802,300
Hadera sub-district	414,100	502,000	558,700	618,700	679,600	738,800
Sharon sub-district	455,000	487,300	531,500	564,900	602,300	643,700
Petach Tikva sub-district	698,000	781,000	856,400	919,100	988,500	1,066,200
Ramla sub-district	332,200	364,700	394,000	417,300	443,000	472,200
Rehovot sub-district	576,200	613,100	660,100	693,400	732,900	781,300
Tel Aviv District	1,376,600	1,500,300	1,632,500	1,771,800	1,921,400	2,085,700
Ashkelon sub-district	522,300	570,700	648,100	758,600	870,300	995,400
Beer Sheba sub-district	691,900	771,200	872,200	989,700	1,113,300	1,241,000
Judea and Samaria	379,500	423,200	472,200	519,500	569,800	629,600
<b>National total</b>	<b>8,463,400</b>	<b>9,297,800</b>	<b>10,188,300</b>	<b>11,131,100</b>	<b>12,133,400</b>	<b>13,223,100</b>

**Table 8B – Low Scenario, Adjusted for the Strategic Housing Plan**

	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Jerusalem District	1,060,800	1,160,300	1,254,100	1,344,500	1,427,300	1,503,600
Safed sub-district	115,700	127,200	137,500	150,000	162,600	176,100
Kinneret sub-district	112,600	122,300	131,800	142,900	154,100	165,800
Jezreel sub-district	492,500	531,400	569,800	613,500	657,300	702,200
Acre sub-district	617,800	667,800	716,300	771,100	826,400	882,800
Golan sub-district	47,400	52,600	57,500	62,300	67,300	72,300
Haifa sub-district	570,900	596,400	623,500	660,300	704,600	756,100
Hadera sub-district	414,100	498,800	549,200	600,300	649,700	694,700
Sharon sub-district	455,000	483,700	521,600	547,000	574,100	602,200
Petach Tikva sub-district	698,000	774,100	837,100	883,600	931,700	981,600
Ramla sub-district	332,200	361,900	386,100	403,000	420,400	439,000
Rehovot sub-district	576,200	608,800	648,200	671,900	699,000	730,800
Tel Aviv District	1,376,600	1,489,600	1,602,800	1,715,300	1,830,000	1,947,700
Ashkelon sub-district	522,300	565,700	633,800	729,800	820,700	916,900
Beer Sheba sub-district	691,900	764,300	852,600	951,700	1,050,400	1,146,500
Judea and Samaria	379,500	416,900	454,500	486,800	517,300	553,100
<b>National total</b>	<b>8,463,400</b>	<b>9,221,600</b>	<b>9,976,700</b>	<b>10,734,100</b>	<b>11,492,900</b>	<b>12,271,500</b>

**Table 8C – High Scenario, Adjusted for the Strategic Housing Plan**

	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Jerusalem District	1,060,800	1,185,300	1,323,400	1,471,600	1,627,400	1,789,200
Safed sub-district	115,700	129,400	144,000	162,400	183,000	207,100
Kinneret sub-district	112,600	124,100	136,800	152,500	169,800	189,600
Jezreel sub-district	492,500	538,000	588,400	648,500	713,400	784,300
Acre sub-district	617,800	675,100	736,500	809,300	887,500	970,700
Golan sub-district	47,400	53,200	59,200	65,600	72,800	80,400
Haifa sub-district	570,900	604,000	644,200	697,600	764,100	847,200
Hadera sub-district	414,100	504,500	567,200	635,900	707,800	781,100
Sharon sub-district	455,000	490,800	541,100	582,500	629,800	684,500
Petach Tikva sub-district	698,000	787,700	875,100	953,900	1,043,600	1,149,200
Ramla sub-district	332,200	367,500	401,700	431,400	465,100	505,200
Rehovot sub-district	576,200	617,400	671,700	714,500	765,900	831,100
Tel Aviv District	1,376,600	1,512,400	1,664,400	1,831,300	2,015,600	2,229,100
Ashkelon sub-district	522,300	575,500	661,900	786,300	917,600	1,071,200
Beer Sheba sub-district	691,900	777,800	891,400	1,027,100	1,175,500	1,334,500
Judea and Samaria	379,500	429,200	489,100	551,400	620,800	704,600
<b>National total</b>	<b>8,463,400</b>	<b>9,371,900</b>	<b>10,395,900</b>	<b>11,521,900</b>	<b>12,759,900</b>	<b>14,159,000</b>

**Table 8D – Medium Scenario, Past Internal Migration Trends**

	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Jerusalem District	1,060,800	1,200,900	1,354,400	1,520,100	1,697,100	1,888,000
Safed sub-district	115,700	126,400	138,400	151,900	166,800	183,600
Kinneret sub-district	112,600	120,800	129,900	139,500	149,600	160,700
Jezeel sub-district	492,500	530,100	569,300	608,200	645,700	682,500
Acre sub-district	617,800	665,400	714,200	762,000	807,200	849,600
Golan sub-district	47,400	50,000	52,800	55,500	58,100	60,700
Haifa sub-district	570,900	599,100	629,000	660,800	695,500	734,400
Hadera sub-district	414,100	452,400	492,700	533,200	573,300	613,900
Sharon sub-district	455,000	507,100	560,200	613,700	668,400	726,700
Petach Tikva sub-district	698,000	785,400	877,000	974,000	1,078,900	1,196,700
Ramla sub-district	332,200	364,600	398,400	433,300	470,500	511,800
Rehovot sub-district	576,200	625,300	674,200	723,700	775,300	832,700
Tel Aviv District	1,376,600	1,469,300	1,566,000	1,667,600	1,776,600	1,894,000
Ashkelon sub-district	522,300	574,100	631,300	693,700	762,700	841,700
Beer Sheba sub-district	691,900	770,200	859,700	959,100	1,067,400	1,186,900
Judea and Samaria	379,500	456,700	540,800	634,700	740,200	859,100
<b>National total</b>	<b>8,463,400</b>	<b>9,297,800</b>	<b>10,188,300</b>	<b>11,131,100</b>	<b>12,133,400</b>	<b>13,223,100</b>

**Table 8E – Low Scenario, Past Internal Migration Trends**

	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Jerusalem District	1,060,800	1,188,600	1,319,800	1,454,400	1,589,600	1,726,000
Safed sub-district	115,700	125,300	135,400	146,200	157,400	169,300
Kinneret sub-district	112,600	119,900	127,300	134,800	142,100	149,500
Jezreel sub-district	492,500	526,400	559,100	589,400	616,300	640,500
Acre sub-district	617,800	661,000	702,200	740,100	773,200	801,500
Golan sub-district	47,400	49,700	51,900	54,000	55,700	57,300
Haifa sub-district	570,900	594,800	617,600	640,400	663,600	688,300
Hadera sub-district	414,100	449,100	483,700	516,500	547,000	576,000
Sharon sub-district	455,000	503,400	549,800	594,100	636,800	680,000
Petach Tikva sub-district	698,000	779,100	858,700	938,800	1,020,700	1,108,500
Ramla sub-district	332,200	361,900	390,800	419,200	447,800	478,400
Rehovot sub-district	576,200	620,900	662,300	701,500	739,800	780,700
Tel Aviv District	1,376,600	1,457,200	1,534,400	1,611,400	1,689,800	1,769,800
Ashkelon sub-district	522,300	569,400	617,900	668,300	720,700	777,700
Beer Sheba sub-district	691,900	763,400	840,400	922,400	1,007,400	1,096,000
Judea and Samaria	379,500	451,500	525,100	603,000	685,000	771,800
<b>National total</b>	<b>8,463,400</b>	<b>9,221,600</b>	<b>9,976,700</b>	<b>10,734,100</b>	<b>11,492,900</b>	<b>12,271,500</b>

**Table 8F – High Scenario, Past Internal Migration Trends**

	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Jerusalem District	1,060,800	1,212,900	1,388,600	1,585,400	1,802,900	2,048,100
Safed sub-district	115,700	127,400	141,400	157,600	176,000	197,700
Kinneret sub-district	112,600	121,700	132,300	144,100	156,900	171,600
Jezreel sub-district	492,500	533,700	579,200	626,500	674,300	723,600
Acre sub-district	617,800	669,500	725,700	783,300	840,300	896,700
Golan sub-district	47,400	50,300	53,600	57,000	60,400	64,000
Haifa sub-district	570,900	603,300	640,000	680,700	726,400	779,200
Hadera sub-district	414,100	455,600	501,500	549,400	599,000	651,200
Sharon sub-district	455,000	510,700	570,400	633,000	699,300	772,400
Petach Tikva sub-district	698,000	791,700	895,000	1,008,700	1,135,800	1,283,400
Ramla sub-district	332,200	367,200	405,700	447,200	492,700	544,700
Rehovot sub-district	576,200	629,500	685,900	745,400	809,800	883,600
Tel Aviv District	1,376,600	1,481,200	1,597,100	1,722,800	1,861,200	2,015,700
Ashkelon sub-district	522,300	578,700	644,500	718,900	803,700	904,500
Beer Sheva sub-district	691,900	776,800	878,600	995,400	1,126,600	1,277,100
Judea and Samaria	379,500	461,800	556,400	666,600	794,600	945,600
<b>National total</b>	<b>8,463,400</b>	<b>9,371,900</b>	<b>10,395,900</b>	<b>11,521,900</b>	<b>12,759,900</b>	<b>14,159,000</b>