

# Israel

## Policy fiche: Managing the impact of climate change on agriculture

### 1. Context of the impact of climate change

In 1992, the United Nations Framework Convention on Climate Change (UNFCCC) was adopted as the basis for a global response to the great challenge of global warming. The Convention was complemented by the 1997 Kyoto Protocol, which currently includes more than 190 Parties. Israel is a party to the UNFCCC since September 1996 and a party to the Kyoto Protocol since February 2004. Accordingly, Israel is committed to contribute to the global efforts to reduce greenhouse gas emissions and combat harmful impacts of climate change.

Since the publication of Israel's First National Communication in 2000, climate change has received growing attention from government and society in Israel. Thus, many actions have taken place in this period by policy makers, industry, research institutes and civil society.

In 2009, Israel's government decided to prepare a climate change plan for Israel and establish a Ministerial Committee on Environmental Protection and Climate Change. The Israel Ministry of Environmental Protection is in charge of coordinating these activities and fulfilling Israel's commitments in the fields of mitigation and adaptation.

Israel faces a number of challenges that require clear and robust energy and climate policies – having average population growth rate of 1.8% per year (2000-2010), soaring energy demand and high emissions per capita despite negligible overall emissions. It is also an arid, coastal country that is exposed to the risks of climate change. Regulatory developments in the last few years have been informed by both international and domestic processes, including the process of joining the OECD (completed in 2010), under which Israel was required to undertake various environmental commitments.

At COP 15 in Copenhagen in 2009, President Shimon Peres declared that Israel would do its utmost to reduce the amount of GHG emissions by 20% by 2020, compared to a business as usual scenario – a reduction of approximately 21 MT CO<sub>2</sub>. The president's commitment led to the formulation of a National Greenhouse Gas Emissions Mitigation Plan in 2010. An interministerial committee, headed by the director general of the Ministry of Finance, formulated a plan which included various measures in the areas of energy efficiency, green building and transportation. Much of the work on energy efficiency was based on a working paper by the Ministry of Energy and Water.

Policy measures concerning energy supply (including renewable energy), which were in the committee's mandate, have not been included in the National GHG Plan.

In 2000 the country issued, under the UNFCCC framework, the First National Communication on CC, which was followed by the Second National Communication in 2010. Besides identifying national sources and amounts of GHG emissions and the national risks deriving from CC at the mid-long term, both reports outlined the (evolution of its) national plan established to provide the country and its society with the necessary tools (strategies, action lines and plans, measures, etc.) to address CC challenges. Such plans involved the definition of both mitigation and adaptation strategies at the national level.

In 2015, the national government submitted its official GHG reduction targets to the UNFCCC and subsequently published a National Plan for Implementation of the Greenhouse Gas Emissions Reduction Targets and for Energy Efficiency (2016). By signing and ratifying the Paris Agreement in 2016 (binding to all parties), Israel officially committed to shift to a low-carbon economy and published a national program (National Plan for Implementation of the Paris Agreement) to implement both the Paris Agreement and the national plan.

Figure 1. Main steps and dates of climate change in Israel

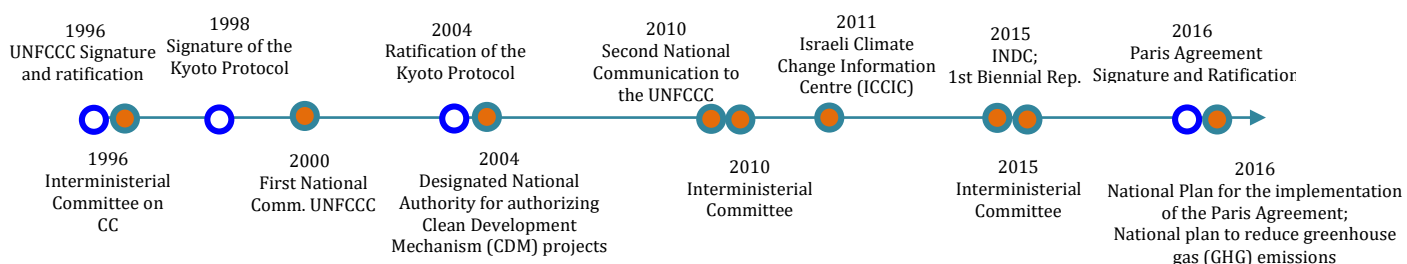


Table 1. "Evaluation board" of the impact of climate change

| High impact (high impact, requiring major action and immediate action)                       |  |  | Negligible impact (the impact is limited but requires follow-up)   |  |  |
|--|--|--|--|--|--|
| Medium impact (increasing impact, requiring minor action, monitoring and medium-term action) |  |  | Uncertain impact (not enough evidence and need for further monitoring and analysis)  |  |  |
| Areas of impact  | Currently (2017)   |  | Near future (2020-2030)  |  | Longer term (2030-2050-2100)   |
| <b>Direct effects on costs</b>   |  |  |  |  |  |
| Risks and insurance  |  |  | Extreme weather events   |  |  |
| Climate variability  | <p>Global climate forecasts predict an average warming of 0.3°C-0.5°C per decade, a reduction in the quantity of average precipitation of between 1.1%-3.7%, and an increase in the frequency and strength of extreme weather events such as heat waves and floods in the Mediterranean region over the next fifty years. In practice, the past four decades have demonstrated an average increase of 0.5°C in temperature per decade in the Mediterranean Sea area (Israel Ministry of Environmental Protection).</p> <p>A trend of rising seawater levels, totalling more than 10 cm, was recorded in the Mediterranean Sea over the past two decades, consistent with scenarios which range from 1 to 10 cm per decade. Such a rise is associated with increased flooding along the coastal plain and increased intrusion of seawater to the coastal aquifer which leads to salinization. Wave storms with wave heights exceeding 3.5 meters have also increased along with exceptional storms with a wave height above 6 meters, which are expected to pose major risks to coastal installations and to the collapse of the coastal cliff.</p> <p>These and other effects of climate change – increased frequency of extreme weather events, reduced rainfall in most areas, drought years, floods, and heat waves – threaten to have a major effect on the water sector, agriculture, public health, biodiversity, the coastal environment and the urban environment in addition to their geostrategic effects and environmental and social impacts. The recognition that current mitigation measures will not prevent climate change calls for a variety of adaptation measures.</p> <p>Observed changes and trends :</p> <ul style="list-style-type: none"> <li>• Annual rainfall has decreased by 9% on average since 1993.</li> <li>• An increase in the frequency and duration of extreme weather events has been observed in recent years, including years that were either exceedingly wet or exceedingly dry.</li> <li>• Nearly seven consecutive years of drought were experienced from 2003 to 2010.</li> </ul> |  | <p>According to the A1B scenario of the Intergovernmental Panel on Climate Change (IPCC), the maximum temperature in Israel is expected to rise by 1.8° C by 2020 compared to the years 1960-1990, whereas the average temperature is expected to increase by 1.5° C.. A 10% decrease in precipitation is expected by 2020</p> |  | <p>According to IPCC scenarios A2 and B2, average temperature is expected to increase by 5° C and 3.5° C in the years 2071-2100, respectively, compared to the years 1961-1990. In addition, a 20% decrease in precipitation is expected by 2050</p> <p>Israeli Climate-Change Forecasts for the Year 2100 (using 2018 as baseline)</p> <ul style="list-style-type: none"> <li>-Mean temperature increase of between 1.6° and 1.8° C.</li> <li>-Reduction in precipitation between 4 and 8 percent; increased rain intensity; and changes in rainfall patterns.</li> <li>-Increase in evapotranspiration by nearly 10 percent.</li> <li>-Greater seasonal temperature variability.</li> <li>-More severe weather events, such as droughts and floods.</li> <li>-Mediterranean biomes expected to shift 300 to 500 km northward; if a 1.5° C warming were to occur, which could mean that Mediterranean ecosystems in Israel, the Palestinian Authority and Jordan would become more desert-like.</li> <li>- Some models predict as much as a 50 percent reduction in mean annual precipitation in the Jordan River Basin.</li> <li>-increase in evapotranspiration by 10 %,</li> </ul> |
| <b>Direct effects on demand</b>  |  |  |  |  |  |
| Water resources  | <ul style="list-style-type: none"> <li>• Reduced rainfall and increased extreme weather events are likely to increase flooding and surface runoff, as well as to reduce the replenishment of water storage.</li> <li>• Reduction in water availability in aquifers and surface water bodies</li> <li>• Deterioration of water quality</li> <li>• Increased probability of flood events</li> </ul> <p>An increase of 1-2°C and a decrease of 10% in precipitation, for instance, could lead to</p>  |  | <ul style="list-style-type: none"> <li>- Increase in the frequency and severity of floods, which may cause major damage to property and to people.</li> <li>-Reduction in groundwater recharge.</li> <li>- Loss of 16.3 MCM of water for each kilometer</li> </ul>   |  | <ul style="list-style-type: none"> <li>- Reduction of 25% in water availability in 2070-2099 in comparison to 1961-1990.</li> <li>- Decrease at the current rate of water flushing the Sea of Galilee will increase its salinity up to 470 mg of chlorine by 2040</li> </ul>   |

|                                    |   |  |   |  |
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|                                    | a decrease of 40-70% in the annual average flow of rivers, which will impact agriculture, water and energy supply.  |  | along the coastal plain, as a result of a potential rise in sea level of 50 centimeters.<br>- Changes in the salinity level of the Sea of Galilee.  |  |
| Agriculture Production             | <p>The economic value of agriculture in Israel is comprised of NIS 25 billion per year for agricultural produce, \$1.2 billion for agricultural products for export, and \$0.9 billion for processed food. The total area cultivated for agriculture is 4,300 square km.</p> <ul style="list-style-type: none"> <li>• Shortage in water supply for agriculture</li> <li>• Damages to crop productivity due to water deficiency and extreme climate conditions</li> <li>• Changes in crop growing seasons</li> <li>• Salination and erosion of soil</li> <li>• Reduced productivity of farm animals</li> <li>• Shortage in fresh animal feed</li> <li>• Increased risks of pests and farm animal diseases</li> </ul> |  | <p>-Damage to crops due to a reduction in water availability in the soil, 20% increase in water demand for irrigation, reduction in fruit and vegetable yields, emergence of new pests and pathogens and increase in the frequency of animal and plant diseases.</p> <p>- Sharp cutbacks in allocations of freshwater resources for agricultural irrigation.</p> <p>- Possible advantages to growth due to an increase in CO2 concentrations in the atmosphere, but potentially also leading to reduced crop yields and intensified use of herbicides.</p> <p>- Increased risk of soil erosion.</p> <p>- Shortage of animal feed and increase in its cost.</p> <p>- Shortening of the productivity season of pastureland.</p> <p>- Damage to populations of pollinating insect species.</p> | <p>-Damage to the nutritional value and shelf life of agriculture produce.</p> <p>-Benefit to certain crops from higher winter temperatures.</p> <p>- Reduced productivity of farm animals.</p> <p>Study examined the influence of two climatic scenarios (A2 and B2) for the years 2070- 2100 on wheat, a central crop in the southern region of Israel, and cotton, which represents the more humid north.</p> <p>- For wheat, under the A2 scenario, the profit turned negative (between -145% and -273% relative to current values), and under the B2 scenario (more moderate), a mixed trend was obtained (between -43% and +35% relative to current values), probably due to an increase of 17% and 10% in precipitation amounts in January and March, respectively, under this scenario</p> |
| Sea level rise and Coastal erosion | Salination and erosion of soil  |  | <p>- Reduction in water availability in aquifers and surface water bodies</p> <p>- Deterioration of water quality</p> <p>- Increased probability of flood events</p>  |  |
| Vector borne-diseases              |   |  | <p>- Increased incidence of parasitic and infectious diseases</p> <p>- Increased thermal stress</p> <p>- Increased risk of damages from extreme weather events</p>  |  |
| Energy                             |   |  | - Increased energy demand due to harsher heat stress,   |  |

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|                                 |   |  | particularly during peak heat waves<br>- Damage to infrastructure in vulnerable areas   |  |
| Biodiversity loss               | <p>Change in climate will bring about changes in ecological services provided by natural ecosystems. Ex: Extinction of some species; Changes in distribution of species; Increase in invasive species, Change in biodiversity of Mediterranean Sea; Wetlands will dry out, Desertification process will be accelerated; Changes in output of crops; Changes in veterinary sector; Reduction in aquaculture</p> <p>Loss of plant species in the semi-arid region due to desertification</p> <p>Damage to local animal species populations</p> <p>Changes in species composition in the Sea of Galilee</p> <p>Damages to nature reserves</p> <p>Increased likelihood of forest fires</p>  |  | <p>- Increase in the desertification of the southern part of Israel.</p> <p>- Desertification is also expected to be exacerbated by climate change in Israel, particularly in the Judean Desert highlands and the northern Negev</p>  | <ul style="list-style-type: none"> <li>- By 2050, desert regions may further lose 10%-60% of the biodiversity component</li> <li>- Reduced flows to Lake Kinneret.</li> <li>- Reduced recharge of groundwater aquifers and negative impacts on freshwater ecosystems.</li> <li>- Further increases in the number and frequency of extreme weather events (e.g. drought years, floods, heat waves), which will result in damage to property and ecosystems</li> <li>- the deserts' biodiversity would lose an additional 15% by 2050</li> </ul>   |
| Infrastructural issues          |   |  | Extreme events (episodic flooding and frost) causing damage to structures   |  |
| -Greenhouse Gas (GHG) Emissions | <p>According to the latest GHG emissions inventory published by the CBS, in 2012 Israel's emissions were 83.04 MtCO<sub>2</sub>e (10.5 tCO<sub>2</sub>e per capita).</p> <p>A GHG Strategy Development was recently initiated by the Ministry of Environment Protection (MoEP) in Israel. The process is managed by an inter-ministerial committee with the objectives to establishing a national target and strategy for GHG emissions reduction by 2030 that will be submitted to the Government for approval, then to the UNFCCC secretariat.</p> <p>The largest anthropogenic source of CO<sub>2</sub> emissions is the oxidation of carbon when fossil fuels are burned to produce energy. In 2011, about 67 million tons of CO<sub>2</sub> were emitted by this process compared to 50 million tons in 1996. The energy industries (power plants and oil refineries) are the largest source of CO<sub>2</sub> emissions (65%), followed by transport (23%). Cement production is the most important non-energy industrial process emitting CO<sub>2</sub>.</p> <p>Increased energy demand due to harsher heat stress, particularly during peak heat waves</p> <p>Damage to infrastructure in vulnerable areas</p> |  | <p>Under a BAU scenario, a 63% increase in GHG emissions is expected from 2000 to 2025. This increase stems mostly from an increase in fuel combustion in the energy sector, mainly in the following subsectors: energy industries (49%), transport (43%) and manufacturing and construction (250%).</p> <p>In the year 2025, under the BAU scenario, total expected emissions will reach 118 million tons of CO<sub>2</sub> eq, whereas potential abatement measures will total 31.7 million tons.</p> | <ul style="list-style-type: none"> <li>-Energy Efficiency: 17% reduction in electricity consumption relative to BAU (business as usual) scenario in 2030</li> <li>-Renewable Energy: 17% of the electricity generated in 2030 will be from renewable sources. (As of mid-2016, some 3% of Israel's electricity is generated by renewables.)</li> <li>-Public Transport: 20% shift from private to public transportation relative to BAU scenario, including a transition from diesel to compressed natural gas for heavy vehicles.</li> <li>- Ministry of Environmental Protection MoEP recommended a 30% reduction target compared to BAU at the conference, the ultimate target that is submitted will have to be approved by the Israeli government.</li> </ul> |
| Fisheries                       |   |  | Fishing and fisheries is an additional 'highly vulnerable'  |  |
| <b>Broader indirect effects</b> |   |  | - An increase in the frequency and duration of extreme weather events has been observed in recent years, including years that were either exceedingly wet or exceedingly dry.   |  |
| Ecosystems                      |   |  |   |  |

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| Public Health | <p>Effects: Extreme heat and cold events that can cause illness and death; Temperature increase will bring invasion of vectors, such as mosquitoes, that will increase transmission of vector, food, and water-borne diseases; Exacerbation of cardiovascular and respiratory diseases by air pollution</p> <p>Increased incidence of parasitic and infectious diseases</p> <p>Increased thermal stress</p> <p>Increased risk of damages from extreme weather events</p> | <ul style="list-style-type: none"> <li>- A rise in extreme weather events along with higher temperatures may increase the mosquito population and change its distribution.</li> <li>- Low probability risk of renewed outbreak of malaria.</li> <li>- Higher temperatures in the beginning of the spring may bring forward mosquito and West Nile Fever hazards to humans.</li> <li>- Increased heat burdens may harm the elderly, the ill and workers exposed to heat</li> </ul> | <ul style="list-style-type: none"> <li>- Reducing the adverse health effects resulting from the increase in extreme weather events due to climate change.</li> <li>- Direct impacts are deaths, disease and injury due to heat waves, floods and storms (including the risks from sewage and chemical contamination) and mental stress, poor air quality, increased pollen, reduced food safety due to higher temperatures and greater exposure to ultraviolet radiation. The indirect effects are widening health and social inequality due to rising global food prices, and food insecurity, causing population displacement and migrations.</li> </ul> |
| Coastal Zone  | <ul style="list-style-type: none"> <li>• Coastal retreat</li> <li>• Sand removal</li> <li>• Damages to coastal infrastructure and tourism</li> <li>• Salination of the coastal aquifer</li> <li>• Damages to the coastal cliff</li> <li>• Increased probability for the invasion of marine alien species</li> <li>• Coral bleaching in the Red Sea</li> </ul>  | <p>Sea level in the Israeli coast is expected to rise by some 0.5 meter by 2050</p>   | <ul style="list-style-type: none"> <li>-Sea level in the Israeli coast is expected to rise by approximately a meter by the year 2100</li> <li>-changes in the salinity level of the Sea of Galilee.</li> <li>-increase in sea level rise of 12-88 cm</li> </ul>  |
| Livestock     |  | <p>Reduced productivity of farm animals</p> <ul style="list-style-type: none"> <li>• Shortage in fresh animal feed</li> <li>• Increased risks of pests and farm animal diseases</li> </ul>  |  |

## 2. Policy options to address such impacts

**How do the measures identified intend to address each specific impact?**

**What outputs (documents) and outcomes (actions) are foreseen and by when?**

| Strategic Documents  | Year & Agency | Objectives and consistency  | How the approved measures will treat the different impacts  |
|--|---------------|---|---|
| Ratification of the Framework Convention on Climate Change | 1996          | <ul style="list-style-type: none"> <li>○ The establishment of mechanisms leveraging large scale private funding together with public funding of energy efficiency projects;</li> <li>○ A program of tenders for renewable energy. The 17% renewable energy target is substantially more ambitious than Israel's current 10% target for 2020;</li> <li>○ Removal of barriers for the uptake of renewable energy;</li> <li>○ Further development of public transport systems in major metropolitan areas such as the construction of the Tel Aviv metropolitan light rail; the extension of the intercity rail system and of the Jerusalem light rail.</li> </ul> | <ul style="list-style-type: none"> <li>• Organized conferences focused on Israel's reduction target and actions the country will take to reduce GHG emissions</li> <li>• Measures to increase the use of natural gas. The recent discovery of additional natural gas reserves off the coast of Israel has and will continue to contribute to a partial switch from coal to natural gas in Israel's fuel mix and which contributed to GHG emissions reduction between 2012 and 2015. The government is now working on the further development of gas fields, expected to have significant mitigation potential;</li> </ul> |
| Israel's First   | MoE           | <ul style="list-style-type: none"> <li>• Provide the first assessment in terms</li> </ul>   | <ul style="list-style-type: none"> <li>• Providing guidelines of activities to</li> </ul>   |

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| National Communication to the UNFCCC   | (At the time, Ministry of Environment)<br>2000 | of GHG emissions' inventory<br><ul style="list-style-type: none"> <li>• Provide the outline of the National Action Plan regarding CC in terms of: <ul style="list-style-type: none"> <li>- Mitigation options,</li> <li>- Vulnerability and adaptation</li> </ul> </li> <li>○ Forecasts, economic analysis and proposed policy</li> </ul>  | increase economic efficiency, improve the environment and reduce GHG emissions, based on technological, economic and legislative mechanisms.<br><ul style="list-style-type: none"> <li>•</li> </ul>  |
| Ratification of the Kyoto Protocol   | 2004   | <ul style="list-style-type: none"> <li>○ The Clean Development Mechanism (CDM) program was established in 1997 by the Kyoto Protocol of the UN Framework Convention on Climate Change. The Protocol obligates countries that are defined as developed, called Annex I countries, to commit to limiting or reducing their greenhouse gas (GHG) emissions. The CDM allows those countries to earn "certified emission reduction" credits by financially supporting emissions-reducing projects in non-Annex I countries, including Israel, that are not bound to reduce emissions under the Protocol.</li> </ul> | <ul style="list-style-type: none"> <li>• Israel signed the Kyoto Protocol in December 1998 and ratified it in February 2004. In December 2009, it ratified an amendment to Annex B that added Belarus to the list of countries with legal commitments under the Protocol.</li> <li>• Israel is not considered an Annex 1 country, and thus, is not legally required to commit to an emissions reduction. This is despite the fact that its GHG emissions are on par with developed countries. However, Israel decreed at the 2009 UN Climate Change Conference in Copenhagen that it would reduce its emissions by 20% by 2020, compared to a "business as usual" scenario. In March 2010, the Israeli government approved the establishment of an inter-ministerial committee to formulate a national plan to reduce greenhouse gas emissions.</li> <li>• The first commitment period of the Kyoto Protocol ran from 2008 through the end of 2012. The new commitment period, which runs through 2020, includes some changes to CDM rules and procedures; they include new commitments for Annex I Parties, a revised list of GHG that will be reported, and emissions reduction targets. Projects that were registered before 2013 will continue to operate under the previous rules.</li> </ul> |
| Israel's Second National Communication to the UNFCCC   | MoEP<br>2010                                   | <ul style="list-style-type: none"> <li>• Updating the First Comm. Report, providing detail on achievements and highlighting challenges</li> <li>• Conducting updated GHG emission inventories and assessments:</li> <li>• Building GHG scenarios while focusing on the necessary steps to reduce these emissions; <ul style="list-style-type: none"> <li>- Diagnosis, critical sectors, GHG inventory/sector, description of CC impacts on sub-sectors; Trend analysis</li> </ul> </li> </ul>  | <ul style="list-style-type: none"> <li>• Provide updating of the National Action Plan regarding CC.</li> <li>• Outline adaptation and mitigation strategies and action plans. Detailing guidelines of activities.</li> <li>• Highlight mitigation and adaptation measures proposed for "major contributors": Energy, Industry, Residential and Commercial Sector, Transport, Agriculture, Land use and Forestry, Waste and Wastewater</li> </ul>   |
| Israel's Intended Nationally Determined Contribution (INDC)  | MoEP<br>2015                                   | <ul style="list-style-type: none"> <li>• In accordance with Decisions 1/CP.19 and 1/CP.20, Israel hereby communicates its Intended Nationally Determined Contribution (INDC) to contribute to the global effort for achieving the objective of the United Nations Framework Convention on Climate Change.</li> <li>• Israel is committed to working towards an ambitious international agreement on climate change, applicable to all Parties and in line with the objective of an average global temperature increase below two degrees Celsius</li> </ul>  | <ul style="list-style-type: none"> <li>• An Israeli Climate Change Information Center (ICCIC) was set up in cooperation with leading academic institutions. Its mandate is to compile a national scientific base on the impact of climate change on areas such as, water resources, biodiversity, public health and urban planning. The Center will prepare policy recommendations to be integrated into national and local adaptation plans and which will be relevant to the challenges being faced in the region as a whole.</li> </ul>   |
| National Plan for Implementation of the GHG Emissions Reduction Targets (National Mitigation Plan) | Government<br>2016                             | <ul style="list-style-type: none"> <li>• Meet the national target for reducing electricity consumption and improving energy efficiency</li> <li>• Meet the national target for reducing private car mileage</li> </ul>   | <ul style="list-style-type: none"> <li>• Develop APs and measures for reducing electricity consumption, improving energy efficiency (incl. buildings) and increasing energy production from renewable energies.</li> <li>• Develop APs and measures fostering the use of public transport, reducing private car mileage and increase fuel efficiency in transport</li> <li>• Establish economic tools (incentives,</li> </ul>  |

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| (Gov. Decision 1403)   |           |   | investment programs, tax policies e.g. green taxation, tax benefits, etc.)<br>Setting up a steering and monitoring committee on reducing GHG emissions. |
| Israel National Plan for Implementation of the Paris Agreement | MoEP 2016 | <ul style="list-style-type: none"> <li>The Paris Agreement is a universal climate accord first adopted on December 12, 2015, at UN Conference on Climate Change – Conference of Parties 21 (COP-21). Signatories to the agreement determined that the global temperature rise must be kept “well below 2°C” by means of varying national targets to reduce greenhouse gas emissions</li> <li>Outlining the plan for implementing the Agreement regarding the following central subjects: <ul style="list-style-type: none"> <li>Reduction of GHG emissions according to the National Plan for GHG reduction targets</li> <li>Monitoring reporting and control system</li> <li>International financing</li> <li>Accompanying the international negotiations</li> <li>Training program</li> </ul> </li> </ul> | Israel’s targets involve a 25% reduction in its 2005 greenhouse gas emissions by 2030 – limiting residents to 7.7 tons of carbon dioxide per capita.    |

## Elaboration of the policies and measures and advancements

The Israel Ministry of Environment Protection (MoEP) is in charge of adopting the necessary steps to respond to the UNFCCC requests, and has funded and led work regarding the completion of the national communication reports (until now, 2000 and 2010) and the INDCs. The MoEP has also established multi-stakeholder structures and bodies (e.g. Interministerial Committees on CC and the ICCIC) to involve pertinent stakeholders into the national CC strategy and thereby gather knowledge, criteria and inputs from them.

## What are the main steps followed and what is the stage of the process?

| Strategic Documents  | Steering   | Process   | Associated actors  |
|--|------------|---|--|
| <b>National Plan for Implementation of the Paris Agreement 2016</b>                                      | MoEP       | <ul style="list-style-type: none"> <li>Same as National Mitigation Plan, since the document presents the national plan for implementing the GHG reduction targets to present plans for addressing the Paris Agreement’s requests over the period 2016-2017.</li> <li>Work conducted under the 2015 Interministerial Committee</li> </ul>  | <ul style="list-style-type: none"> <li>Same as National Mitigation Plan</li> </ul>   |
| <b>National Plan for Implementation of the GHG Emissions Reduction Targets (Gov. Decision 1403) 2016</b> | Government | <ul style="list-style-type: none"> <li>The State of Israel established an Interministerial Committee in 2015 for the formulation of the national target (INDC)</li> <li>Based on its work (in clusters/working groups), conclusions of the Interministerial Committee were adopted in Decisions 542 and 1403 issued in 2015 and 2016 (official mitigation targets for Israel and National Mitigation Plan, respectively) including committee recommendations.</li> <li>The plan focuses on activities for the 2016-2017 period and foresees updating, whenever necessary</li> </ul> | -Most government ministries, relevant statutory authorities, major government companies, representatives of industry and commerce, local authorities and NGOs + national and international experts |
| <b>Israel’s INDC 2015</b>  | MoEP       | <ul style="list-style-type: none"> <li>Establishment of an Interministerial Committee, headed by MoEP. In charge of examining the national potential for reducing GHG emissions by 2030 and formulating official targets.</li> </ul>  | - Document submitted jointly to the government by 3 Ministers: Environmental Protection and Finance and National Infrastructures, Energy and Water   |

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|  |  | <ul style="list-style-type: none"> <li>• Specific working groups in place for: <ul style="list-style-type: none"> <li>- Scenario (BAU and abatement) assessment</li> <li>- A cost-benefit analysis carried out on &lt;100 different abatement measures and technologies in various economic sectors including energy, transport, buildings, industry, agriculture, waste.</li> <li>- Mitigation potential was assessed in those sectors and combined for the whole economy.</li> </ul> </li> <li>• Removal of obstacles to implementation examined.</li> <li>• Scenario assessments considered GHG emissions of domestic aviation.</li> </ul>  | Resources <ul style="list-style-type: none"> <li>- The interministerial Committee included representatives from all relevant government ministries, public utility companies, industry and commerce, local government, environmental and NGOs, academia and other national and international experts from various disciplines.</li> </ul>   |
| <b>Israel' Second National Communication to the UNFCCC 2010</b>              | MoEP   | <ul style="list-style-type: none"> <li>• Establishment of a Min. Committee on Env.Protection and CC coordinated by the MoEP</li> <li>• Gathering experts together to address the anticipated impacts of CC and present recommendations on adaptation measures for water, agriculture, seas &amp; coasts, public health, biodiversity, energy, infrastructure and the economy.</li> <li>• Emission forecasts and mitigation options were identified based on two independent studies commissioned by the MoEP. Major mitigation measures included energy and buildings, transport and waste</li> </ul>  | Interministerial Committee: central and local gov., the industrial and the electricity sectors, academic and research institutions, and NGOs.   |
| <b>Israel's First National Communication</b>                                 | Ministry of Environment                              | <ul style="list-style-type: none"> <li>• The first inventory of emissions and proposed removals of GHG was prepared on the basis of the 1996 IPCC guidelines.</li> <li>• An Interministerial Committee on Climate Change was established and charged with overseeing the national inventory of GHG emissions as well as the initial reports on mitigation options, action plans and recommendations to reduce GHG.</li> </ul>  | <ul style="list-style-type: none"> <li>• The Interministerial Committee includes representatives of govern. ministries, industries and NGOs.</li> <li>• Ministries of Finance, Infrastructures &amp; Energy, Transport, Industry &amp; Trade, Agriculture and Science particularly engaged in the process.</li> <li>• Academic centres providing significant inputs, part. on the GHG inventory, forecasts &amp; economic analysis, and mitigation &amp; adaptation options.</li> </ul> |
|  |  | <b>ONGOING</b>   |   |
| Decision N° 474 (2009) on the Creation of a Strategic Plan for CC adaptation | Interministerial Committee (2009) leaded by the MoEP | <ul style="list-style-type: none"> <li>• Professional working groups on different fields of adaptation set up.</li> <li>• Working groups focus on areas such as biodiversity, public health, water resources and droughts.</li> <li>• In charged of closing the gaps in existing knowledge on the impacts of CC in Israel based on different scenarios, surveying available means for minimizing damage and vulnerability and identifying Israeli technology for dealing with climate change that may assist other countries.</li> <li>• Setting up of the ICCIC (2011) to help developing knowledge and integrate it into national policy</li> <li>• To date, it has not been delivered.</li> </ul> | As in other cases, multi-stakeholder. <ul style="list-style-type: none"> <li>• Representatives of government organisms and national agencies, public sector, academia and NGOs.</li> </ul>  |

**Which actors were involved, how and at what stage?**



- The Israel Ministry of Environment Protection  
Coordination and conduction of work regarding climate change is (and has been over the last two decades) under the lead of the Israel Ministry of Environment Protection (MoEP), which concerns the implementation of the UNFCCC guidelines and requests, i.e. completion of the national communication reports (until now, 2000 and 2010) and the INDCs.
- Other government agencies in close relationship to CC national works:  
Ministry of Economy; Ministry of Finance; Ministry of National Infrastructures, Energy and Water; Ministry of Transport and Road Safety; Ministry of Industry, Trade and Labor; Ministry of Agriculture and Rural Development; Ministry of Foreign Affairs; Central Bureau of Statistics (CBS).
- The Interministerial Committee on Climate Change
  - Established to contribute to the national work conducted under UNFCCC (e.g. GHG emission inventories, reports on mitigation and adaptation, action plans for GHG emission reduction, formulation of recommendations and strategies for reducing GHG and for adapting to CC).
  - Interministerial Committee on CC is headed by the MoEP and includes representatives of government ministries, industries and non-governmental organisations.
- The Israeli Climate Change Information Centre (ICCIC)  
Set up by the MoEP in 2011 in the wake of Government decision in 2009 on the preparation of a national CC adaptation program. It is established at Haifa University, in cooperation with Tel Aviv University, the Technion-Israel Institute of Technology and the Samuel Neaman Institute.  
Dedicated to compiling the scientific knowledge base and the policy documents which will be integrated in the national plan.  
The ICCIC brings together ca 100 representatives from public administration, academia, industry, and NGOs to gather and analyse information, identify existing knowledge gaps, identify risks and CC implications, and to submit recommendations on prioritized research requirements, proposed national adaptation policy, and ways of marketing the scientific and technological knowledge collated for application in Israel and around the world.  
Main focuses:
  - Anticipated changes in climate in Israel from 1990 to 2010, 2020, 2030, 2040, and 2050
  - Implications of CC on public health
  - Implications of CC on the water sector
  - Implications of CC on biodiversity
  - Implications of CC on urban planning and building
  - Implications of CC on Israel's economy
  - Implications of CC on geostrategic issues associated with Israel's neighbours
- Academic centres (both private and public)  
Active and key stakeholders in the definition of the national strategy and works to address CC (both mitigation and adaptation): besides the ones specifically involved in the ICCIC, some of these are namely: the Soreq Nuclear Research Center; the Arava Institute for Environmental Studies; the Israel Environmental Policy Research; the Blaustein Institute for Desert Research (Ben Gurion University of the Negev); the Hebrew University of Jerusalem; Israel Meteorological Service; Israel Oceanographic and Limnological Research; Taub Center for Social Policy Studies in Israel; etc.
- International/ regional organisations and partnerships and cooperation programs:
  - Barcelona Convention-UNEP-MAP
  - World Bank
  - OECD
  - ISERD - Israel-Europe. Directorate for Research & Innovation. Cooperation between Israel and Europe in thematic and/or Bi-National Programs.
  - GLOWA Jordan River: German-Israeli-Jordanian-Palestinian cooperation project addressing the vulnerability of regional water resources as a case study of Eastern Mediterranean ecosystems under climate change
  - Mashav: Israel's Agency for International Development Cooperation
- Private sector  
Also present in all stages of the national process against CC, either in the form of environmental and/or engineering consultancy firms or as public and government-owned companies (e.g. Israel Electric Corporation, the Manufacturers Association of Israel)
- Non-governmental organisations:  
KKL JNF - Keren Kayemet LeYisrael – Jewish National Fund, Israel's largest green NGO; Greenpeace.

## What data has been considered and from what sources?

| Document  | Source   |
|---|--|
| National Plan Paris Agreement (2016) and National "Mitigation" Plan (2016)      | - 2015 Interministerial Committee and related work on INDC/ formulation of Israel's targets for GHG reduction  |
| INDC (2015)   | - Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories and the Global Warming Potential (GWP) values from the IPCC Second Assessment Report (1995)<br>- Scenarios (BAU and abatement) developed using the Long range Energy Alternatives Planning System (LEAP model).   |
| Israel's Second National Communication to the UNFCCC (2010)                     | - 1996 Interministerial Committee including national and local authorities, local government, the industrial sector, the electricity sector, academic and research institutions, and non-governmental organizations providing information and data inputs:<br>- <b>National:</b> data from MoEP and most ministries; CBS; National Insurance Institute; Israel Public Utilities Authority<br>- <b>Private sector:</b> contributions from the Israel Electric Corporation, environmental/ engineering consultancy firms<br>- <b>Academic:</b> Diverse literature published in scientific journals by national & international researchers & academic centres/ universities<br>- <b>International cooperation organisms:</b> IEA, Centre for International Agricultural Development, International Arid Land Consortium, International Renewable Energy Agency; World Bank; OECD; UNEP;<br>- <b>ONG:</b> KKL-NJF among other environmental organisations |
| Israel National Report on CC. First National Communication to the UNFCCC (2000) | - <b>National:</b> Data/information/reports available in national ministries (MoEP, Central Bureau of Statistics, etc.)<br>- <b>Academic:</b> Diverse literature published in scientific journals by national & international researchers & academic centres/ universities<br>- <b>International cooperation organisms:</b> UNEP/MAP reports<br>- IPPC reports and guidelines<br>- <b>ONG</b> Greenpeace reports   |

## 3. Cross-analysis: policy options and climate impacts

The analysis of the relevance and coherence of Israel action to fight against climate change is based on National Strategy on Climate Change

Table 2. Agriculture and climate change "cross analysis sheet"

| Fully considered            |  | Weakly considered  |
|-----------------------------|--|--|
| Consider the key components |  | Do not consider or no specific knowledge   |
| Areas of impact             | <b>CC MITIGATION</b><br>Gov. Decision N°1403 (2016) unoff.<br>Translation<br>National Plan Implementation Paris Agreement<br><b>ADAPTATION TO CC</b><br>2nd National Communication to the UNFCCC   | <b>ADAPTATION TO CC</b><br>2nd National Communication to the UNFCCC  |
| risks and insurance         | <ul style="list-style-type: none"> <li>Security, political and economic situation;</li> </ul>  | <ul style="list-style-type: none"> <li><b>Improve insurance coverage</b> in the face of extreme events, natural disasters and unprofitable seasons due to climatic changes</li> </ul>  |
| Climate variability         | <ul style="list-style-type: none"> <li>Promote research and raise public awareness</li> <li>Monitor and coordinate responses to extreme weather events together</li> <li>Coordinate adaptation to gradual changes in temperature and rainfall that could lead to the outbreak of diseases due to the invasion of new disease vectors</li> <li>Strengthen the preparedness of the health system through such means as personnel training and dissemination of information and guidelines to employees and the public</li> </ul> | <ul style="list-style-type: none"> <li>Consider climate variability in spatial and temporal planning in development</li> <li>Promotion of interdisciplinary climate research and development of appropriate training programmes</li> </ul> |
| Water Resources             | <ul style="list-style-type: none"> <li>Use water saving devices and minimize water losses</li> </ul>   | <ul style="list-style-type: none"> <li>Large-scale desalination of seawater, maximising energy efficiency:</li> </ul>  |

|                                    |   |  |  |
|------------------------------------|---|--|--|
|                                    | <ul style="list-style-type: none"> <li>• Increase wastewater treatment</li> <li>• Prevent pollution and remediate contaminated wells</li> <li>• Advance water-sensitive planning</li> <li>• Reuse grey water and treated wastewater</li> </ul>  |  | <ul style="list-style-type: none"> <li>• Three large-scale desalination facilities currently provide 320 million m<sup>3</sup> of potable water to all sectors. By 2015, 2025 and 2050, respectively, new desalination facilities along the southern end of the country's Mediterranean coast are expected to cover 62.5%, 70% and 100% of domestic water demand. Energy efficiency is maximised through the bidding process for the construction of these plants. Energy efficiency is promoted by giving preference to natural gas (rather than use of coal) and to efficient technological energy recovery systems. Israel's desalinate ion water production is therefore among the most energy-efficient (3.5 kWh/m<sup>3</sup>) and cost-efficient (USD 0.54/m<sup>3</sup>) in the world. While large-scale desalination significantly increases water, availability, it has potentially adverse environmental impacts, in particular in the form of greater energy consumption and thus, increases in greenhouse gas emissions.</li> </ul> |
| Agriculture Production             |   |  | The effects of climate change on agricultural production are expected to translate into negative impacts on agricultural incomes and prices, with repercussions on food security   |
| Sea level rise and Coastal erosion | <ul style="list-style-type: none"> <li>• The shallow aquifer complex is also very vulnerable to ongoing and serious pollution from agriculture, solid waste and wastewater.</li> </ul>  |  |  |
| Vector-borne diseases              | <ul style="list-style-type: none"> <li>• Manage invasive species and deal with invasive disease vectors</li> <li>• Expand the scientific base for preparedness through monitoring and research</li> <li>• Establish a government agency to serve as the hub for sustainable green building in Israel</li> </ul>   |  |  |
| Energy                             | <ul style="list-style-type: none"> <li>• Incorporate courses on energy-saving buildings, sustainable design and climate change adaptation in institutes of higher learning</li> <li>• Establish a basic inventory and forecast for key sources of air pollution and GHG emissions in the city.</li> <li>• Set targets for air pollutant and GHG emissions reduction (no less than 20% by 2020 in comparison to 2000).</li> <li>• Develop and adopt a short to long term local action plan to reduce air pollution and GHG emissions.</li> <li>• Implement all measures and actions derived from the local action plan in the city and municipality.</li> <li>• Monitor and control air pollution and GHG emissions and report on the actions and measures implemented within the framework of the local action plan.</li> </ul> |  | <ul style="list-style-type: none"> <li>• Adoption of an energy efficiency target to reduce electricity consumption on the order of 18-20% by 2030.</li> <li>• Adoption of a renewable energy target on the order of 22-23% of electricity generation in 2030.</li> <li>• Adoption of a national target to reduce private vehicle use by 25% relative to BAU levels, by 2030</li> </ul>   |
| Biodiversity loss                  | <ul style="list-style-type: none"> <li>• Reduce pressure on freshwater ecosystems and recognize nature's right to water.</li> <li>• Promoting education and awareness of biodiversity in the urban space, with special attention to the impacts of floods, fires, desertification and invasive species.</li> <li>• Basing urban planning and ecosystem management on the results of surveys of urban natural assets.</li> <li>• Conserving urban biodiversity by such means as protected areas around natural assets (such as nature reserves or parks), ecological corridors, and creation and protection of habitats, and reducing the impacts of urban heat islands through urban forestry and green roofs</li> </ul>  |  | <ul style="list-style-type: none"> <li>- Incorporation of climate change implications in the management of natural reserves to allow for species migration. Ecological corridors between different reserves to enable the increase in the wealth of species and a genetic flow between the areas.</li> <li>- Greater examination and focus on rare species and highly sensitive ecological communities which require large areas. Larger open spaces increase biological diversity.</li> <li>- Allocation of conservation areas in the transition zones between the arid climate and the Mediterranean climate – in the northern Negev, in the Judean plain, and east Lachish.</li> <li>- Allocation of resources for the establishment of a biodiversity monitoring plan, which</li> </ul>  |
| Infrastructure Issues              |   |  | <ul style="list-style-type: none"> <li>• Extreme events (episodic flooding and frost) causing damage to structures</li> </ul>  |
| Greenhouse Gas (GHG) Emissions     | <ul style="list-style-type: none"> <li>• Reduce its GHG emissions by 20% in the year 2020 relative to a 'business as usual' scenario. With its growing population and an expanding economy, the national GHG mitigation plan was developed to draw a course for steering the Israeli economy into a low-carbon future while accommodating continued economic growth.</li> </ul>   |  | <ul style="list-style-type: none"> <li>• Of the total energy efficiency potential, implementation of the efficiency measures that were assessed in-depth are expected to achieve a 15% reduction in electricity consumption in the residential, commercial, public, industrial and water sectors, reducing Israeli electricity consumption to 74.8 TWh in 2030 (without the Palestinian Authority), and to 86.4 TWh including the</li> </ul>   |

|                       |   |  |  |  |
|-----------------------|---|--|--|--|
|                       |   |  | <ul style="list-style-type: none"> <li>Palestinian Authority.</li> <li>Implementation of the energy efficiency measures is expected to yield a total emission reduction of 5.3 MtCO<sub>2</sub>e in 2030.</li> </ul>   |  |
| Fisheries             |   |  | <ul style="list-style-type: none"> <li>Fishing and fisheries is an additional 'highly vulnerable' issue in Israel</li> </ul>   |  |
| Ecosystems            |   |  | <ul style="list-style-type: none"> <li>Damage to coastal species and ecosystems</li> </ul>   |  |
| public health         | <ul style="list-style-type: none"> <li>Establishing a monitoring system which is accessible to local authorities in real time and includes data on mortality and morbidity, populations at risk and meteorological data.</li> <li>Ensuring continuous data collection on the presence of vectors which can serve as disease carriers in different local authorities</li> <li>Providing guidelines to the public and to civil servants on heat waves and cold waves and preparing emergency response plans, especially for vulnerable and high risk groups.</li> <li>Providing information to the public and to civil servants on preparedness for climate change through websites, lectures, and more.</li> <li>Promoting urban environmental management including green building, maintenance of urban infrastructure, treatment of pest breeding grounds, and air conditioning of public institutions.</li> </ul> |  | <ul style="list-style-type: none"> <li>adaptation to gradual changes in temperature and rainfall which could lead to the outbreak of diseases due to the invasion of new disease vectors.</li> <li>strengthening the preparedness of the health system through personnel training and dissemination of information and guidelines to employees and the public</li> </ul> |  |
| Coastal Zone          |   |  | <ul style="list-style-type: none"> <li>Seawater intrusion in coastal aquifers</li> </ul>   |  |
| Livestock             |   |  | <ul style="list-style-type: none"> <li>Food insecurity</li> </ul>  |  |
| Decline of landscapes | <ul style="list-style-type: none"> <li>Conserve open areas and the ecological corridors between them</li> <li>Enforce laws and policies that prevent adverse effects on open areas</li> <li>Provide economic incentives for green building, apply mandatory regulations for energy ratings, tag new and rehabilitated green buildings</li> </ul>  |  |  |  |

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