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Climate Change Profile: PALESTINIAN TERRITORIES

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Climate Change Profile: Palestinian Territories

The Palestinian Territories refer to the West Bank (located at the West Bank of the river Jordan, bordering the Dead Sea) and the Gaza - strip (a coastal area bordering the Mediterranean Sea, see [Map 1](#)). In 2012, the UN adopted a resolution to provide the country a 'non-member observer status'¹. To date, the conflict with neighbouring state Israel persists.

Even though climate change is not the most pressing issue for the people in the Palestinian Territories, the climate risks are significant and will compound current and future vulnerability. The Palestinian Territories are characterized by both a high bio-physical and socio-economic vulnerability to climate change, combined with limited capacity to respond to projected and current climate changes². Inhabitants of the West Bank and Gaza are living in areas facing serious challenges in water availability. Recent and projected climate trends indicate that temperatures in the area will rise, precipitation will decrease, and high precipitation events (HPE) will occur. This will result in increased water shortages, flooding and subsequent challenges in food security. The capacity of the Palestinians to cope with and adapt to these challenges, is constrained due to its limited control over and access to its natural resources, especially land and water, as a result of the restrictions imposed by Israel.

Biophysical vulnerability

Current climate

The Palestinian Territories are located in a transitional zone, between the Mediterranean and arid, tropical zones. The climate in the Palestinian Territories is predominantly of the eastern Mediterranean type; warm to hot, dry summers and mild, rainy winters with rainfall between 100–700 mm³ ⁴. During high summer (July – August), the average temperature is 27.4 °C; the coolest months are January and February with an average temperature of 12,4 °C⁵. The various climate zones, combined with its geographic location close to Africa, Asia and Europe, have made it historically rich in biodiversity⁶.

¹ <http://www.un.org/press/en/2012/ga11317.doc.htm>

² Feitselson, E., Tamimi, A. & Rosenthal, G. (2012). Climate change and security in the Israeli-Palestinian context. *Journal of Peace Research*, 49 (1), 241–257. Available via http://foeme.org/uploads/Climate_Change_and_ME_Security_JPR_Feitselson,Tamimi,Rosenthal.pdf

³ Palestinian Central Bureau of Statistics, via http://www.pcbs.gov.ps/site/lang_en/881/default.aspx, accessed on 7 June 2016

⁴ FAO Aquastat (2008), Occupied Palestinian Territory. Available via http://www.fao.org/nr/water/aquastat/countries_regions/PSE/PSE-CP_eng.pdf

⁵ Worldbank Climate Change Knowledge Portal; http://sdwebx.worldbank.org/climateportal/index.cfm?page=country_historical_climate&ThisRegion=Middle%20East&ThisCCCode=PSE, accessed on 6 June, 2016.

⁶ Drackenberg, Olof and H. Wolf (2013) Environment and Climate Change Policy Brief occupies Palestinian territory (oPt). Sida's Helpdesk for Environment and Climate Change. Available via <http://sidaenvironmenthelpdesk.se/wordpress3/wp-content/uploads/2014/02/Environment-and-Climate-Change-Policy-Brief-oPt.pdf>

The climatic conditions (rainfall, temperature) in the Palestinian Territories vary per location, per season and with altitude. Especially the West Bank is, despite its relatively small size, very climate diverse (see [Map 2](#)). There are five major climate zones within the Palestinian Territories^{7 8}:

1. Jordan Valley region: about 75 to 90 metres above sea level with an average annual rainfall of only 100 to 200 mm. Soil salinization is a major problem.
2. Eastern slopes region: a transitional zone between the Mediterranean and desert, with an average annual rainfall of 150 to 300 mm.
3. Central highlands region: lies 400 to 1000 m above sea level, annual rainfall varies between 300 mm in the south to 600 mm in the north.
4. Semi-coastal region: 100 to 300 meters above sea level, rainfall 400 to 700 mm/year.
5. Coastal plain (Gaza Strip): rainfall of 200–400 mm/year.

The **West Bank** is relatively arid, with 50% of the land having rainfall less than 500 mm/year, including a hyper-arid area with rainfall less than 100 mm/year. The remaining land has conditions with rainfall ranging between 500–800 mm/year⁹. From the north to the south (of the West Bank), the annual amount of rainfall decreases (from 700 mm around Jenin to 80–100 mm in the south), while the annual temperature increases. The area that suffers from greatest aridity is located at the south eastern side of the West Bank¹⁰ (see [Map 3](#)). The **Gaza strip**, a largely flat terrain, is characterized by a coastal climate and receives around 200 to 400 mm/year rainfall¹¹. In the north, the average seasonal rainfall is 522 mm (Beit Lahiya governorate) and in the south, average seasonal rainfall is 225 mm (Rafah governorate)¹², see [Map 3](#).

⁷ FAO Aquastat (2008), Occupied Palestinian Territory. Available via http://www.fao.org/nr/water/aquastat/countries_regions/PSE/PSE-CP_eng.pdf

⁸ Ighbareyeh, J., Cano-Ortiz, A., & Cano, E. (2014). Case study: analysis of the physical factors of Palestinian bioclimate. *American Journal of Climate Change*, 2014, 3, 223–231. Available via <http://dx.doi.org/10.4236/ajcc.2014.32021>

⁹ Applied Research Institute, Jerusalem (ARIJ, 2003). Climatic zoning for energy efficient building in the Palestinian Territories (the West bank and Gaza). Technical report, submitted to UNDP/ PAPP. Available via <http://www.arij.org/files/admin/2003/2003%20climatic%20zoning%20for%20energy%20efficient%20buildings%20in%20the%20PT.pdf>

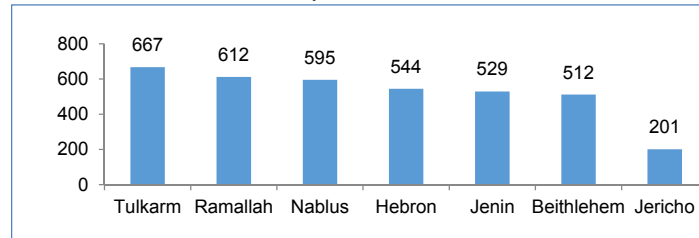
¹⁰ UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

¹¹ Applied Research Institute, Jerusalem (ARIJ, 2003). Climatic zoning for energy efficient building in the Palestinian Territories (the West bank and Gaza). Technical report, submitted to UNDP/ PAPP. Available via <http://www.arij.org/files/admin/2003/2003%20climatic%20zoning%20for%20energy%20efficient%20buildings%20in%20the%20PT.pdf>

¹² UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

The Palestinian Central Bureau of Statistics (PCBS) reported the following amounts of rainfall on several monitoring locations on the West Bank for the year 2015¹³:

Quantity of Annual Rainfall in the West Bank by Station Location, 2015 (mm)



Groundwater, one of the most important natural resources and the backbone of the agricultural and domestic needs, is affected by the amounts of rain falling in the region.¹⁴ Both the West Bank and the Gaza strip, depend on ground water aquifers as the major source of water (see [Map 4](#)). The volume of annual renewable ground water resources in the West Bank is 669 MCM and the yearly surface water is estimated at an average of 110 MCM, while the annual renewable ground water is estimated at 45 MCM in the Gaza Strip¹⁵. Winter rains replenish water resources from ground water aquifers¹⁶.

The **Gaza strip** lies above part of the Coastal Aquifer Basin, which runs from Haifa to northern Egypt through Gaza. Due primarily to its permeable sandy cover, the aquifer itself has is vulnerable to pollution from the surface. The aquifer underneath Gaza has been overexploited for decades, at a rate three times its limit for sustainable use¹⁷. Overexploitation and decreasing precipitation has led to increased seawater intrusion and salinization of freshwater resources. Studies suggest that over 90% of the Gaza Strip's water resources are already undrinkable and this figure is projected to rise¹⁸.

Current trends

Over the last 30 years, the mean temperature in the Middle Eastern region (Israel, Jordan, Lebanon, Palestinian Territories and Syria) significantly increased at a rate of 0.4 °C per decade

¹³ PCBS (2016). Palestine in figures, 2015. Ramallah – Palestine

¹⁴ IUCN (2013) Resilience to Climate Change in Palestine: The Fine Balance between Floods and Droughts. Available via <http://cmsdata.iucn.org/downloads/Palestine.pdf>

¹⁵ EQA & UNCCD (2012) The National Strategy, Action Programme and Integrated Financing Strategy to Combat Desertification in the Occupied Palestinian Territory. Environment Quality Authority, United Nations Convention to Combat Desertification, Ramallah.

¹⁶ Heyn, H. M. (2014). Palestinian Territories. Water is still the biggest problem. Climate report 2014. Energy security and climate change worldwide. Available via http://www.kas.de/wf/doc/kas_40875-544-2-30.pdf?150401114715

¹⁷ Mason, M., Zeitoun, M, & El Sheikh, R (2011). Conflict and social vulnerability to climate change: lessons from Gaza. Climate and Development, 3 (4), pp. 285–297. DOI: 10.1080/17565529.2011.618386

¹⁸ Heyn, H. M. (2014). Palestinian Territories. Water is still the biggest problem. Climate report 2014. Energy security and climate change worldwide. Available via http://www.kas.de/wf/doc/kas_40875-544-2-30.pdf?150401114715

(Map 5)¹⁹ ²⁰. At the same time rainfall has decreased (Map 6). Based on the analyses of precipitation and temperature data in the last century which reveal rising summer temperature and a delay in the rainfall season, some scientists suggest that climate changes are already happening²¹

The main problem related to the current climate trend of rising temperatures and declining precipitation, is the **availability of water**. In the last 15 years, the wider region (including Israel and Jordan) has seen reductions in the amount of rainfall. Average rainfall for the West Bank in the years 2008/9 was 425mm – 22% below the long-term average of 538mm. Subsequently, the 316.3mm rainfall for the Gaza Strip was 12% below the long-term average²². The Palestinian government reported negative impacts of rainfall reductions on agricultural production in the West Bank and, in the Gaza strip, of problems of winter crops due to delayed rains²³. Besides experiencing region-wide reduced precipitation, access to water for the inhabitants of the Palestinian Territories is also impacted by security and military activities of Israel²⁴.

Climate change

Projection models for the Middle East and eastern Mediterranean indicate a strong increase in temperature and a decrease in total annual precipitation²⁵ ²⁶. For the end of this century, a warming ranging from 1.8 to 5.1°C is likely. Annual precipitation rates are likely to decrease by 10% in 2020, by 20% by 2050, and may reach 35% by 2100 with an increased risk of summer droughts²⁷ ²⁸. Further, a strong increase in the duration of heat waves, as well as a strong reduction of cold spells length is projected²⁹. Also the number of yearly days of high temperatures (daily maximum temperatures above 30 °C) is expected to rise³⁰. High Precipitation

¹⁹ Climate Service Center Germany (2015). Climate fact sheet Israel–Jordan–Lebanon–Palestine–Syria, updated version 2015.

²⁰ UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

²¹ UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

²² UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

²³ UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

²⁴ UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

²⁵ UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

²⁶ Climate Service Center Germany (2015). Climate fact sheet Israel–Jordan–Lebanon–Palestine–Syria, updated <http://eprints.lse.ac.uk/39002/> version 2015.

²⁷ Ighbareyeh, J., Cano–Ortiz, A., & Cano, E. (2014). Case study: analysis of the physical factors of Palestinian bio climate. *American Journal of Climate Change*, 2014, 3, 223–231. Available via <http://dx.doi.org/10.4236/ajcc.2014.32021>

²⁸ Mason, M., Zeitoun, M, & El Sheikh, R (2011). Conflict and social vulnerability to climate change: lessons from Gaza. *Climate and Development*, 3 (4), pp. 285–297. DOI: 10.1080/17565529.2011.618386

²⁹ Climate Service Center Germany (2015). Climate fact sheet Israel–Jordan–Lebanon–Palestine–Syria, updated <http://eprints.lse.ac.uk/39002/> version 2015.

³⁰ UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

Events (HPEs) are likely to lead to flash floods³¹. Sea level in the eastern Mediterranean is expected to rise by 10 cm every decade, which is consistent with global estimates of a 0.6–1.6 m increase by the end of this century³².

Expected effects of climate changes on food security and water availability as well as energy, health and the environment, are ³³:

Water:

- increased water shortages from lower rainfall and higher evaporation;
- increased flash floods from greater rainfall variability and HPEs;
- insufficient rain to recharge groundwater aquifers: lower precipitation affects groundwater aquifer replenishment and surface runoff, loss of storage in coastal aquifer. In 2020, it is estimated that the Palestinian Territories will experience a water deficit of 271×106 m³ ³⁴;
- reduced surface and groundwater quality: due to salinization of fresh water sources, availability of drinkable water is reduced. The situation in Gaza is particularly serious. Gaza has no surface water available and relies solely on groundwater aquifers. It is estimated that 95% of Gaza's aquifer is not safe for drinking without treatment (due to salinization and contamination)³⁵. Further, the permeable soil is susceptible from leakage of surface contamination and pollution.

Agriculture:

- more frequent droughts and increased desertification;
- changes in economic viability of crops (e.g. shorter growing seasons);
- increased crop water requirements;
- decline in grazing ranges and stocks;
- higher food prices;
- soil degradation and desertification.

Energy:

- increased energy demands to cope with more temperature extremes;
- rising fuel demands to cope with water shortages;

³¹ UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

³² Mason, M., Zeitoun, M., & Mimi, Z. (2012). Compounding vulnerability: impacts of climate change on Palestinians in Gaza and the West Bank. *Journal of Palestine Studies*, 41 (3), pp 1–16. DOI: 10.1525/jps.2012.xli.3.38

³³ This section draws heavily on UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

³⁴ Mimi, Z. Ziara, M., & Nigim, H. (2003). Water conservation and its perception in Palestine – a case study water. *Water and Environmental Management Journal*, 17, pp 152–156.

³⁵ UNCTAD (2015). Report on UNCTAD assistance to the Palestinian people: developments in the economy of the Occupied Palestinian Territory. Available via https://water.fanack.com/pdf-reader/?src=/wp-content/uploads/sites/2/2015/12/report_on_UNCTAD_assistance_to_the_palestinian_people.pdf

Public health:

- pressure on public health and increased occurrence of diseases related to (the lack of) water such as diarrhea, cholera and dehydration;
- increased heat stress from high temperature extreme events³⁶;
- spatial and temporal alteration of diseases, such as malaria³⁷;

Coastal areas:

- saline intrusion into the Coastal Aquifer;
- land use impacts from sea-level rise and coastal erosion: the Mediterranean coast is expected to lose kilometers of beach area, cliff erosion will accelerate³⁸;
- soil degradation;
- loss of biodiversity: northwest migration of ecological systems, loss of sensitive ecosystems³⁹.

Socio-economic vulnerability**Key facts:**

GDP (PPP) per capita (2015) ⁴⁰ :	USD 5,009.9
Population (April 2016) ⁴¹ :	4,816,503
Population growth rate (2014) ⁴² :	3.0%
Projected population (2050) ⁴³ :	9,790,690
Population density per km ² (2015) ⁴⁴ :	775,5
Human Development Index (2014) ⁴⁵ :	163 out of 188 countries
Corruption Perception Index (2015) ⁴⁶ :	44 out of 168 countries
Adult literacy (2015) ⁴⁷ :	96.5% (98.4% men; 94.5% women)

³⁶ Feitselson, E., Tamimi, A., & Rosenthal, G. (2012). Climate change and security in the Israeli-Palestinian context. *Journal of Peace Research*, 49 (1), 241–257. Available via http://foeme.org/uploads/Climate_Change_and_ME_Security_JPR_Feitelson,Tamimi,Rosenthal.pdf

³⁷ Feitselson, E., Tamimi, A., & Rosenthal, G. (2012). Climate change and security in the Israeli-Palestinian context. *Journal of Peace Research*, 49 (1), 241–257. Available via http://foeme.org/uploads/Climate_Change_and_ME_Security_JPR_Feitelson,Tamimi,Rosenthal.pdf

³⁸ Feitselson, E., Tamimi, A., & Rosenthal, G. (2012). Climate change and security in the Israeli-Palestinian context. *Journal of Peace Research*, 49 (1), 241–257. Available via http://foeme.org/uploads/Climate_Change_and_ME_Security_JPR_Feitelson,Tamimi,Rosenthal.pdf

³⁹ Feitselson, E., Tamimi, A., & Rosenthal, G. (2012). Climate change and security in the Israeli-Palestinian context. *Journal of Peace Research*, 49 (1), 241–257. Available via http://foeme.org/uploads/Climate_Change_and_ME_Security_JPR_Feitelson,Tamimi,Rosenthal.pdf

⁴⁰ World Bank Data – GDP per capita, PPP. <http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>

⁴¹ Palestinian Central Bureau of Statistics. http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/gover_e.htm

⁴² World DataBank (2016) available via <http://databank.worldbank.org/data/reports.aspx/source=PSE&eries+8periods=>

⁴³ UNDESA (2015): World Population Prospects: The 2015 Revision. <http://esa.un.org/wpp/> and <https://esa.un.org/unpd/wpp/Download/Probabilistic/Population/>

⁴⁴ World Bank Data – Population density. <http://esa.un.org/unpd/wpp/Download/Standard/Population/>

⁴⁵ UNDP (2014). <http://hdr.undp.org/en/content/table-1-human-development-index-and-its-components> UNDP (2014). <http://hdr.undp.org/en/content/table-1-human-development-index-and-its-components>

⁴⁶ <http://www.transparency.org/cpi2014/results> <http://www.transparency.org/cpi2015>

⁴⁷ World Factbook (CIA, 2015). Available via <https://www.cia.gov/library/publications/the-world-factbook/geos/we.html>.

Accessed on 7 June 2016.

Unemployment rate (2014)⁴⁸: 17.7% (West Bank) and 43.9% (Gaza)
 Youth unemployment rate (2014)⁴⁹: 41% (37% male; 64.7% female)

The Palestinian territory is highly vulnerable and seriously affected by water scarcity and climate change. Climate change further intensifies the existing food security and water related problems. A recent publication of the Palestine Red Crescent Society, states that 16 to 47% of the people in Gaza or on the West Bank experience food insecurity⁵⁰. Food security is to a large extent linked to poverty. Cash and food assistance have an impact on reducing poverty rates and increasing food security. Currently, approximately 88% of food consumption is imported, and this figure is expected to increase⁵¹.

Agriculture is an important sector for food security in the Palestinian Territories. In 2015 it employed 11.5%⁵² of the country's workforce and is considered an important shock absorber in terms of food security⁵³ ⁵⁴. However, the economic contribution of the sector to the country's GDP is declining. In 1970, it was the dominant sector in the economy of the Palestinian Territories, providing employment for a large part of the population and contributing 36% to the GDP⁵⁵. The production shift in the Palestinian territory in the 1990s towards export-oriented markets is now a major challenge as a consequence of the economic collapse combined with Israel's closure policy. As a result, agriculture's role in the economy has declined considerably: the contribution of agriculture to the GDP was 9.5% in 2000 and 3.8% in 2014. Nonetheless, agriculture was the second largest employer of women; accounting for over 20% of working women⁵⁶.

Water scarcity and water quality are key environmental and economic challenges. The annual water share of Palestinians is less than 200m³ per capita which is significantly below the water scarcity limit of 500m³ set by the World Health Organization. The water situation is particularly acute in Gaza, where it is estimated that 26% of all diseases observed in the area are water-

⁴⁸ World Factbook (CIA, 2015). Available via <https://www.cia.gov/library/publications/the-world-factbook/geos/we.html> and <https://www.cia.gov/library/publications/the-world-factbook/geos/gz.html>. Accessed on 7 June 2016.

⁴⁹ World Factbook (CIA, 2015). Available via <https://www.cia.gov/library/publications/the-world-factbook/geos/we.html>. Accessed on 7 June 2016.

⁵⁰ PRCS (2016). Situation Analysis Occupied Palestinian Territories, 31 May 2016. Available via http://www.ifrc.org/Global/Documents/MENA/201605/2016-05_PS-PRCS_oPt.pdf

⁵¹ NRO (2013). Multi-annual Strategic Plan 2014–2017. Towards a Palestinian State. NRO: 2013.

⁵² World Factbook (CIA, 2015). Available via <https://www.cia.gov/library/publications/the-world-factbook/geos/we.html>. Accessed on 7 June 2016.

⁵³ FAO Aquastat (2008), Occupied Palestinian Territory. Available via http://www.fao.org/nr/water/aquastat/countries_regions/PSE/PSE-CP_eng.pdf

⁵⁴ ARIJ (2015). Food production–consumption assessment to improve sustainable agriculture & food security in the West Bank – Palestine. Available via <http://www.arij.org/booklets-leaflets/683-palestinian-agricultural-production-and-marketing-between-reality-and-challenges.html>

⁵⁵ FAO Aquastat (2008), Occupied Palestinian Territory. Available via http://www.fao.org/nr/water/aquastat/countries_regions/PSE/PSE-CP_eng.pdf

⁵⁶ ILO (2015). The situation of workers in the occupied Arab territories. Geneva: International Labour Office. Available via http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_368279.pdf

related. Constrained access to water for agriculture reduces yields and prospects for agricultural growth further. Looking to the future the Palestinian Territories (as well as neighboring countries) face projected significant reductions in water availability as a result of climate change.

Agricultural production in the Palestinian Territories has already been affected by recent droughts which are projected to become more pronounced over time. Climate change effects are already being noticed by people in the PT. Reflecting their recognition of the increased likelihood of drought and HPEs, IUCN reported that residents of the West Bank consider floods and droughts as the most climate-related risks affecting their region⁵⁷. Continuing population growth and projections of regional climate change will intensify water stress for Palestinians. It has been estimated that the Palestinian Territories will experience a water deficit of 271X106 m³ by 2020. The challenge will be to increase food security (by domestic production and/or imports) in conditions of increased water stress within the context of water allocation patterns determined by Israel⁵⁸.

Socio-economic vulnerability to climate change in the Palestinian Territories must be seen in the political-economic context of tension and violence between Israel and the state of Palestine⁵⁹. Studies suggest that restrictions and limitations that inhabitants of the Palestinian Territories face (e.g. restrictions in importing goods into the Gaza strip, limitation to obtain work permits, limitations to mobility), impairs their capability to take appropriate mitigation and adaptation measures⁶⁰. Water resources are almost under complete control by Israel; Palestine controls just 21% of its water resources⁶¹.

Also, challenges in food security partly stem from increased demand for food (e.g. from population growth), but mainly come from limited (physical, social and economic) access of Palestinians to food. These limitations are political in nature⁶². Israeli restrictions contribute to the overuse of available resources, depleting soil nutrients and fresh water resources thus reducing current and future resilience. Coping with, or adapting to, as well as increasing resilience to climate risks and changes must be seen within the political-economic context.

⁵⁷ IUCN (2013) Resilience to Climate Change in Palestine: The Fine Balance between Floods and Droughts. Available via <http://cmsdata.iucn.org/downloads/Palestine.pdf>

⁵⁸ Drackenberg, Olof and H. Wolf (2013) Environment and Climate Change Policy Brief occupies Palestinian territory (oPt). Sida's Helpdesk for Environment and Climate Change. Available via <http://sidaenvironmenthelpdesk.se/wordpress3/wp-content/uploads/2014/02/Environment-and-Climate-Change-Policy-Brief-oPt.pdf>

⁵⁹ Vishwanath, T. et al (2014). *Seeing is believing: poverty in the Palestinian territories*. Washington, DC ; World Bank Group. <http://documents.worldbank.org/curated/en/2014/01/19243623/seeing-believing-poverty-palestinian-territories>

⁶⁰ Mason, M., Zeitoun, M., & Mimi, Z. (2012). Compounding vulnerability: impacts of climate change on Palestinians in Gaza and the West Bank. *Journal of Palestine Studies*, 41 (3), pp 1–16. DOI: 10.1525/jps.2012.xli.3.38

⁶¹ Drackenberg, Olof and H. Wolf (2013) Environment and Climate Change Policy Brief occupies Palestinian territory (oPt). Sida's Helpdesk for Environment and Climate Change. Available via <http://sidaenvironmenthelpdesk.se/wordpress3/wp-content/uploads/2014/02/Environment-and-Climate-Change-Policy-Brief-oPt.pdf>

⁶² NRO (2013). Multi-annual Strategic Plan 2014–2017. Towards a Palestinian State. NRO: 2013.

National government strategies and policies

On 1 February 2015, the state of Palestine acceded to the UN Convention of Biological Diversity (CBD) with the publication of its Fifth National Report⁶³ ⁶⁴. The Palestinian Territories submitted its formal instrument of accession of the the UN Framework Convention on Climate Change (UNFCCC) on 18 December 2015, and was granted a formal 'party' status on 17 March 2016⁶⁵. Being a formal party enables active participation in international climate discussions and decisions and gives access to international climate finance, such as the Green Climate Fund. To date, there is no Intended Nationally Determined Contribution (INDC) submitted by the Palestinian Territories⁶⁶.

The development of climate change strategies and plans in the Palestinian Territories has been largely donor-driven. The development of climate change policies and plans was led by the UNDP as part of its worldwide Adaptation Programme, aiming to assist poorer countries in their responses to climate change⁶⁷. Before 2008, climate change was not considered a policy priority by the Palestinian Authority (for example: climate change was not mentioned in the Palestinian Reform and Development Plan 2008–2010). Since 2008, the UNDP Programme of Assistance to the Palestinian People (UNDP/PAPP) funded capacity building for climate change adaptation, and the preparation of the Climate Change Adaptation Strategy and Programme of Action for the Palestinian Authority (PAPA) in 2010⁶⁸.

The PAPA focuses on reducing water insecurity and food insecurity and recommends that priority should be given to no-regret and low-regret measures that are considered to have the highest levels of adaptive capacity and technical feasibility. No-regrets options are those that are justified under current climate conditions and are further justified when probable climate change is considered. Low-regrets options are those that require limited additional outlays to address the effects of climate change.

No-regrets adaptation actions (in no order of priority):

1. development of flood contingency plans;
2. local increases in rainfall interception capacity;
3. establishment of clear water use priorities;
4. introduction of more efficient irrigation techniques;
5. review of drinking water quality management systems to incorporate climate risks;
6. increased (sustainable) production of freshwater;
7. increased use of brackish water and treated wastewater use;
8. equitable and reasonable utilization of trans-boundary water resources, between the Israelis and Palestinians (implying a fairer allocation of groundwater and freshwater).

Low regrets adaptation actions (in no order of priority)

⁶³ See website UN CBD List of parties, accessed on 8 June 2016, via <https://www.cbd.int/information/parties.shtml>

⁶⁴ State of Palestine (2015). Fifth National Report to the convention on biological diversity. Available via http://cms-data.iucn.org/downloads/palestine_s_fifth_national_report_fv.pdf

⁶⁵ <http://newsroom.unfccc.int/unfccc-newsroom/state-of-palestine-joins-convention/>

⁶⁶ See UNFCC INDC's submission page, via <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>

⁶⁷ Mason, M., Zeitoun, M., & Mimi, Z. (2012). Compounding vulnerability: impacts of climate change on Palestinians in Gaza and the West Bank. *Journal of Palestine Studies*, 41 (3), pp 1–16. DOI: 10.1525/jps.2012.xli.3.38

⁶⁸ UNDP (2010). Climate Change adaptation strategy and programme of action for the Palestinian authority. Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

1. prioritization of irrigation for highest value crops;
2. increased use of water harvesting;
3. protection of coastal sand dunes in the Gaza strip;
4. diversification of rural livelihoods;
5. incorporation of climate adaptation in land use planning;
6. increased use of precision agriculture for improved soil and crop management;
7. selection of crop and ruminant selections for more tolerance to heat and drought.

Other relevant national plans and policies, related to climate change are:

- The Agricultural Sector Strategy “Resilience and Development”, 2014–2016⁶⁹: strategic objectives related to climate change are:
 - efficient and sustainable management of natural resources;
 - enhanced agricultural production, productivity and competitiveness, as well as enhanced contribution of agriculture to food security.
- Water sector strategy and water sector reform plan⁷⁰: measures considered in this plan are (i) groundwater supply development (drilling well and rehabilitation of existing springs and wells); (ii) assess impact of climate change (vulnerability assessment); (iii) demand management and strategic planning (physical water loss, water use reduction, changing crop patterns and water use restrictions); (iv) water harvesting (including storm water) and (v) map alternative resources (purchased water, desalinization, reuse of waste water).
- The National Strategy, Action Programme and Integrated Financing Strategy to Combat Desertification in the Occupied Palestinian Territory (2012) ⁷¹.
- Drought conditions and management strategies in Palestine (2014)⁷² ⁷³: measures to alleviate water scarcity include (i) reallocation management of water resources, (ii) actions to increase water availability and (iii) water demand management.
- Environmental Sector Strategy 2011–2013⁷⁴.

⁶⁹ Ministry of Agriculture (2013). National Agriculture Sector Strategy “Resilience and Development” 2014–2016. Available via <http://www.apis.ps/up/1417423273.pdf>

⁷⁰ PWA (2013). Water sector reform plan 2014–2016 (final). Available via <http://www.pwa.ps/userfiles/file/تقارير/تصنيف%201/FinalReformPlan2014-16PWA.pdf>

⁷¹ EQA & UNCCD (2012) The National Strategy, Action Programme and Integrated Financing Strategy to Combat Desertification in the Occupied Palestinian Territory. Environment Quality Authority, United Nations Convention to Combat Desertification, Ramallah.

⁷² Abdo, K. (2014). Drought conditions and management strategies in Palestine. Ministry of Agriculture, state of Palestine. Available via http://drought.unccd.int/drought/Near-East-and-North-Africa_files/Palestina.pdf

⁷³ National Drought Management Plan for Palestine and technical report on its progress, available via Mimi, Z. (2014). Technical report on progress for the implementation of the national drought management plan for Palestine. UN-DESA: 2014, available via <https://sustainabledevelopment.un.org/content/documents/6664Progress%20for%20the%20Implementation%20of%20the%20National%20Drought%20Management%20Plan%20for%20Palestine%20.pdf>

⁷⁴ EQA (2010). Environment Sector Strategy (2011–2013). Available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6056

Climate finance

On 1 February 2015, the state of Palestine acceded to the UN Convention of Biological Diversity (CBD)⁷⁵ and as noted above was granted formal 'party' status to the UNFCCC in March 2016⁷⁶. The entry as formal party to the UNFCCC has opened access for the Palestinian Territories to climate funds that were previously unavailable when it had an observer status. Potential climate finance funds include⁷⁷:

- The Adaptation Fund⁷⁸;
- The Clean Development Mechanism (CDM)⁷⁹;
- The Green Climate Fund⁸⁰;
- Global Environmental Facility (GEF)⁸¹.

Currently, the World Bank and the United Nations provide climate funds for the Palestinian Territories. The World Bank portfolio in West Bank and Gaza includes 17 projects for a total of USD 161 million⁸². Climate related projects focus on water & sanitation and energy & electricity (see projects listed in [Annex](#)).

Since 1993, the UN finances multiple projects in the Palestinian Territories through the Programme of Assistance to the Palestinian People (UNDP/PAPP)⁸³. The graph below depicts the contribution of UNDP/PAPP per year, from 1993 to 2011⁸⁴.

⁷⁵ See website UN CBD List of parties, accessed on 8 June 2016, via <https://www.cbd.int/information/parties.shtml>

⁷⁶ See website UNFCCC, accessed on 8 June 2016, via <http://newsroom.unfccc.int/unfccc-newsroom/state-of-palestine-joins-convention/>

⁷⁷ Climate Policy Observer (2016). In-depth: Palestine's full membership to the UNFCCC. Available via <http://climateobserver.org/depth-palestines-full-membership-unfccc/>

⁷⁸ <https://www.adaptation-fund.org/projects-programmes/project-information/projects-map-view/>

⁷⁹ <http://cdm.unfccc.int/index.html>

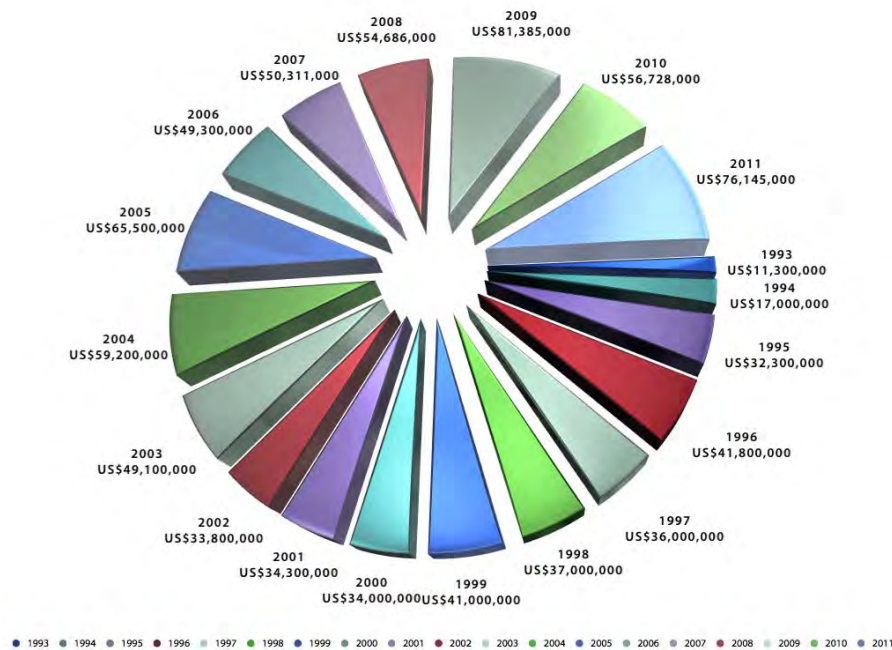
⁸⁰ <http://www.greenclimate.fund/home>

⁸¹ <https://www.thegef.org/gef/home>

⁸² World Bank project map, available via [http://maps.worldbank.org/p2e/mcmap/map.html?org=ibrd&level=coun-try&code=GZ&title=West%20Bank%20and%20Gaza](http://maps.worldbank.org/p2e/mcmap/map.html?org=ibrd&level=country&code=GZ&title=West%20Bank%20and%20Gaza)

⁸³ http://www.ps.undp.org/content/papp/en/home/operations/projects/environment_and_energy.html

⁸⁴ <http://www.undp.ps/en/aboutundp/projects.cfm>



Climate change projects

Though the larger part of UNDP/PAPP projects focuses on poverty reduction, strengthening democratic governance, youth, education and healthcare, there are also projects focusing on climate change. These projects mostly focus on water supply (increasing availability and quality) and increasing food security (e.g. agricultural development). Examples of projects are:

- Construction of Khan Younis Waste Water Treatment Plant (KYWWTP): UNDP/PAPP, government of Japan and the Islamic Development Bank, funded a waste water treatment plan in governorate Khan Younis, located at the southern part of the Gaza strip. This plant helps protecting public health and environmental pollution by preventing sewage from leaking into the environment and water aquifers. The plant will have a capacity of 26,600 cubic metres per day. Project preparations started 2006, the project was launched in 2015 and is estimated to be fully functional in February 2020⁸⁵.
- Rehabilitation of water facilities in Area C of the West Bank: the government of Japan funded this initiative aiming to provide quick tangible improvements in access to water for agricultural development and irrigated farming. The project will deliver: (i) 234 water cisterns with a total capacity of 22,400 cubic metres in the Jerusalem and Hebron governorates; (ii) 5 water storage reservoirs in the Jordan Valley and Qaliqilyah; (iii) 8 km of irrigation networks; (iv) upgrades of 10 underground water wells and (v) 4 water user associations for capacity building in the Jordan Valley⁸⁶.
- Resilience against natural disasters: this Iceland-funded project aims to promote disaster risk prevention, mitigation and preparedness in the Palestinian Territories, mainly by capacity building, improving technical skills and engaging major city stakeholders in implementing prevention and preparedness actions⁸⁷.

⁸⁵ http://www.ps.undp.org/content/papp/en/home/operations/projects/environment_and_energy/renewable-energy-generation-through-solar-panels---gaza.html

⁸⁶ http://www.ps.undp.org/content/papp/en/home/operations/projects/environment_and_energy/rehabilitation-of-water-facilities-project-in-area-c-of-the-west/

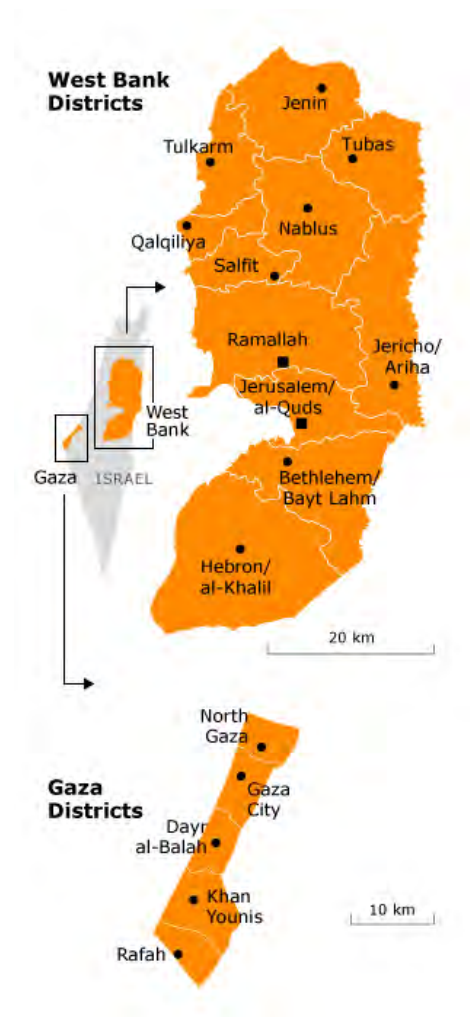
⁸⁷ http://www.ps.undp.org/content/papp/en/home/operations/projects/environment_and_energy/resilience-against-natural-disasters.html

Examples of World bank funded projects are:

- Gaza Emergency Response for Electricity Network Rehabilitation: this project finances scaling up and reconstruct the electricity infrastructure.
- Water sector capacity building project (additional financing): this project aims to strengthen the capacity of governmental institutes (PWA) to effectively plan, monitor and regulate water sector development.

An extended list of projects can be found in [Annex](#).

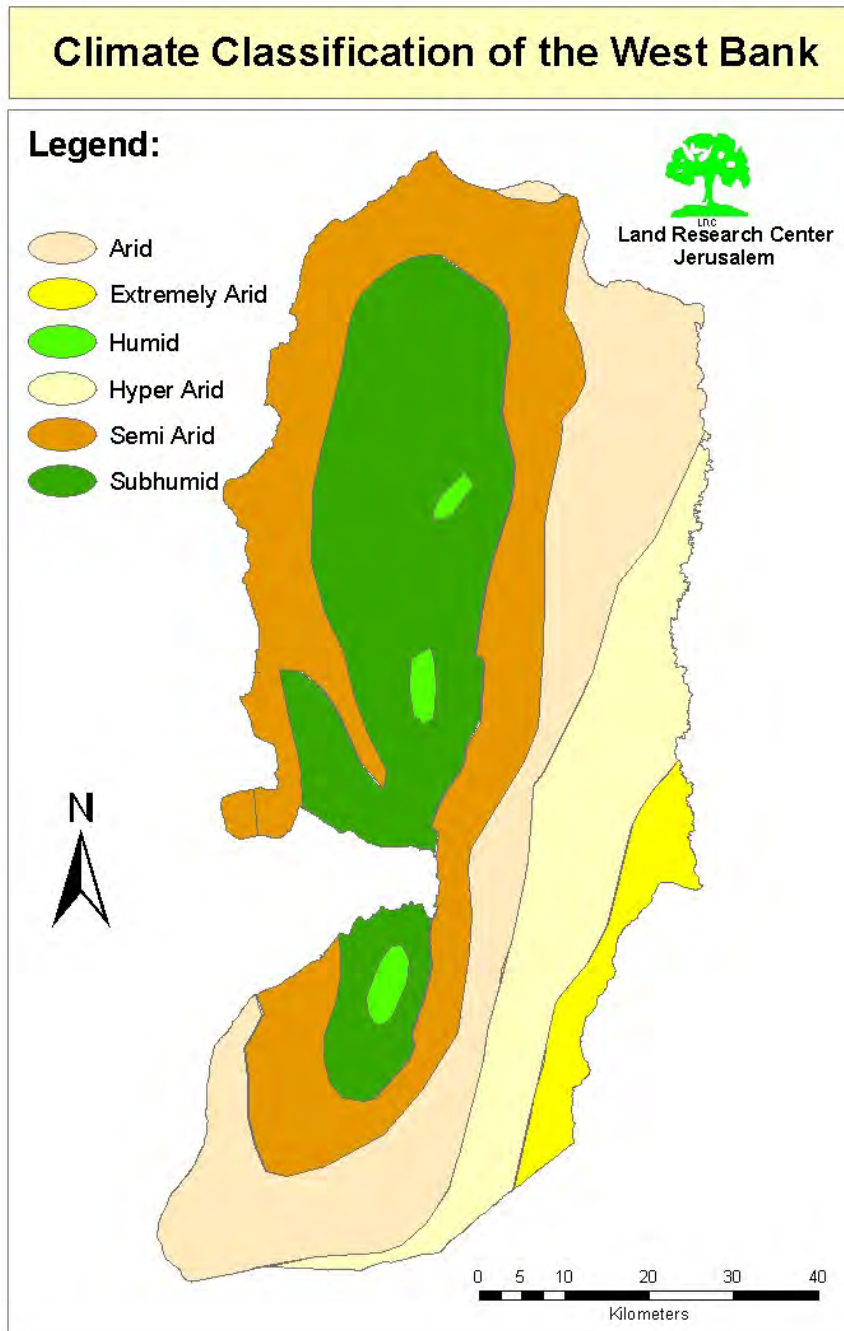
Map 1: Map of (governorates of) the Palestinian Territories



Source: Fanack⁸⁸.

⁸⁸ https://chronicle.fanack.com/wp-content/uploads/sites/5/2014/10/local-government_pal_districts_map1_01.jpg

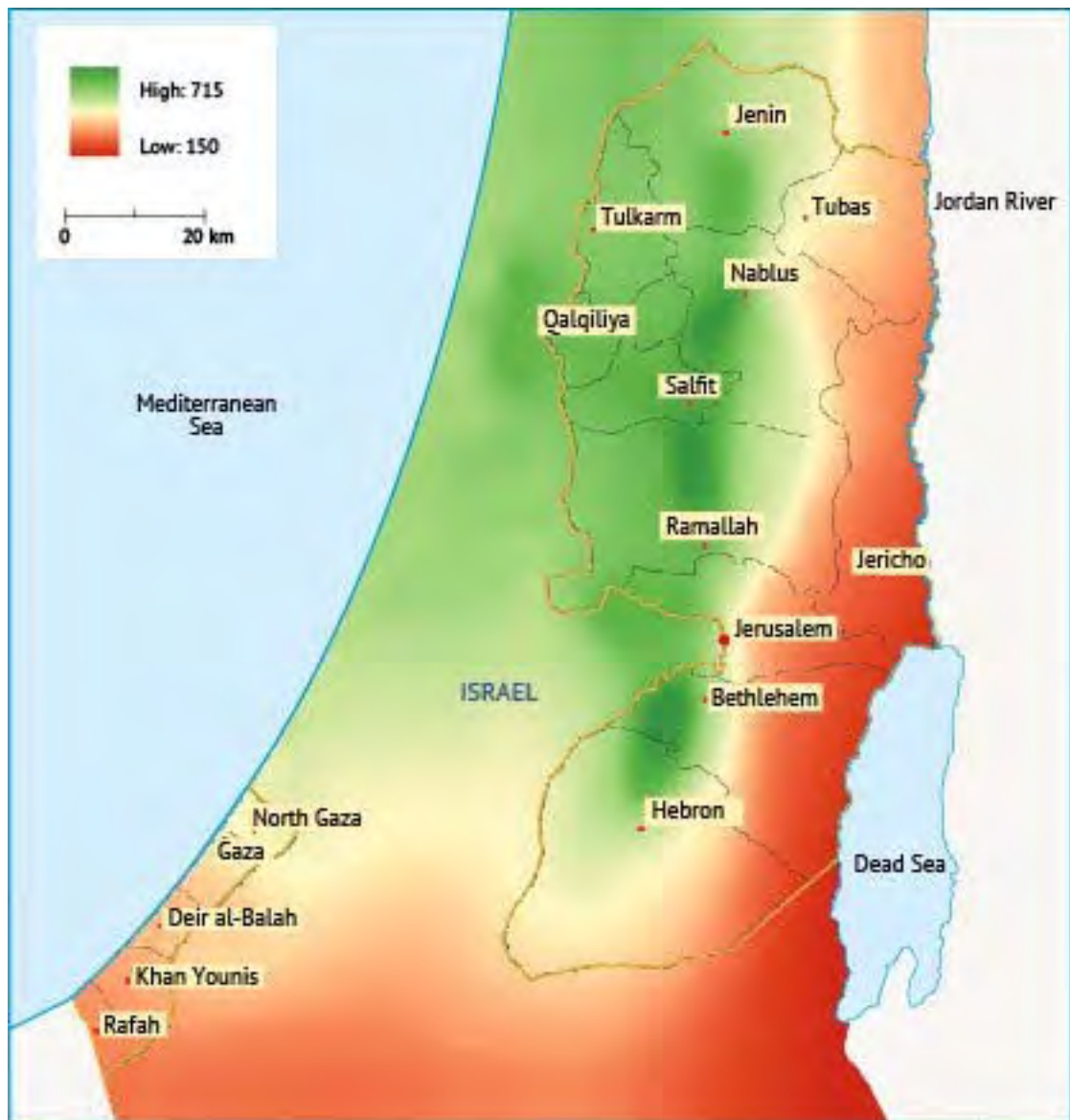
Map 2: Climate classification of the West Bank



Source: UNDP (2010)⁸⁹.

⁸⁹ UNDP (2010), Climate Change adaptation strategy and programme of action for the Palestinian authority. available via http://www.lacs.ps/documentsShow.aspx?ATT_ID=6054

Map 3: Annual rainfall Palestinian Territories, 2015



Source: FANACK⁹⁰ and ARIJ⁹¹

⁹⁰ <https://water.fanack.com/palestine/climate-and-rainfall/>

⁹¹ <http://www.arij.org/maps-of-palestine.html>

Map 4: Mountain and coastal aquifers (2002), Palestinian Territories

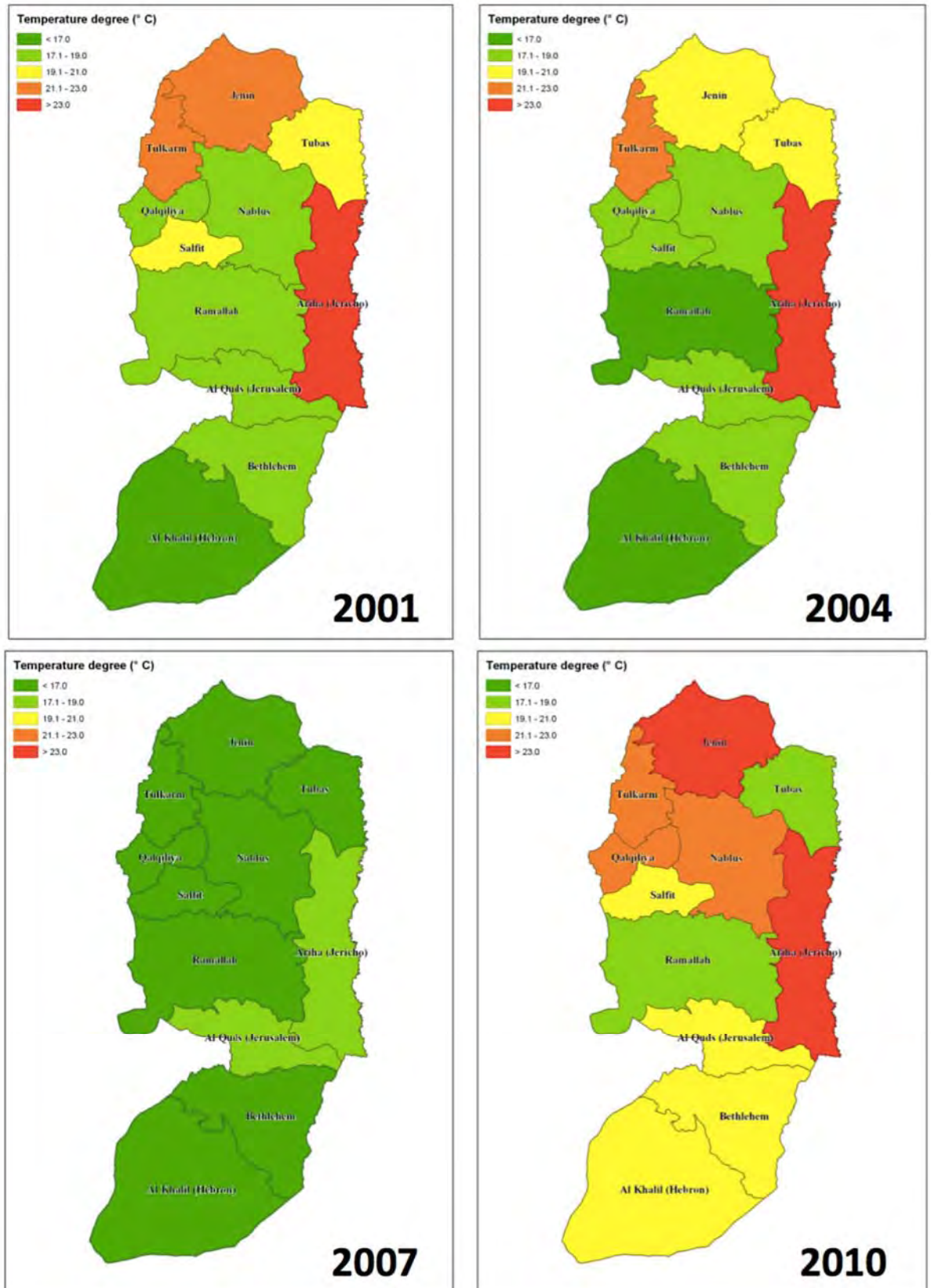
Mountain and Coastal Aquifers



Source: UN Cartographic section (December 2002)⁹².

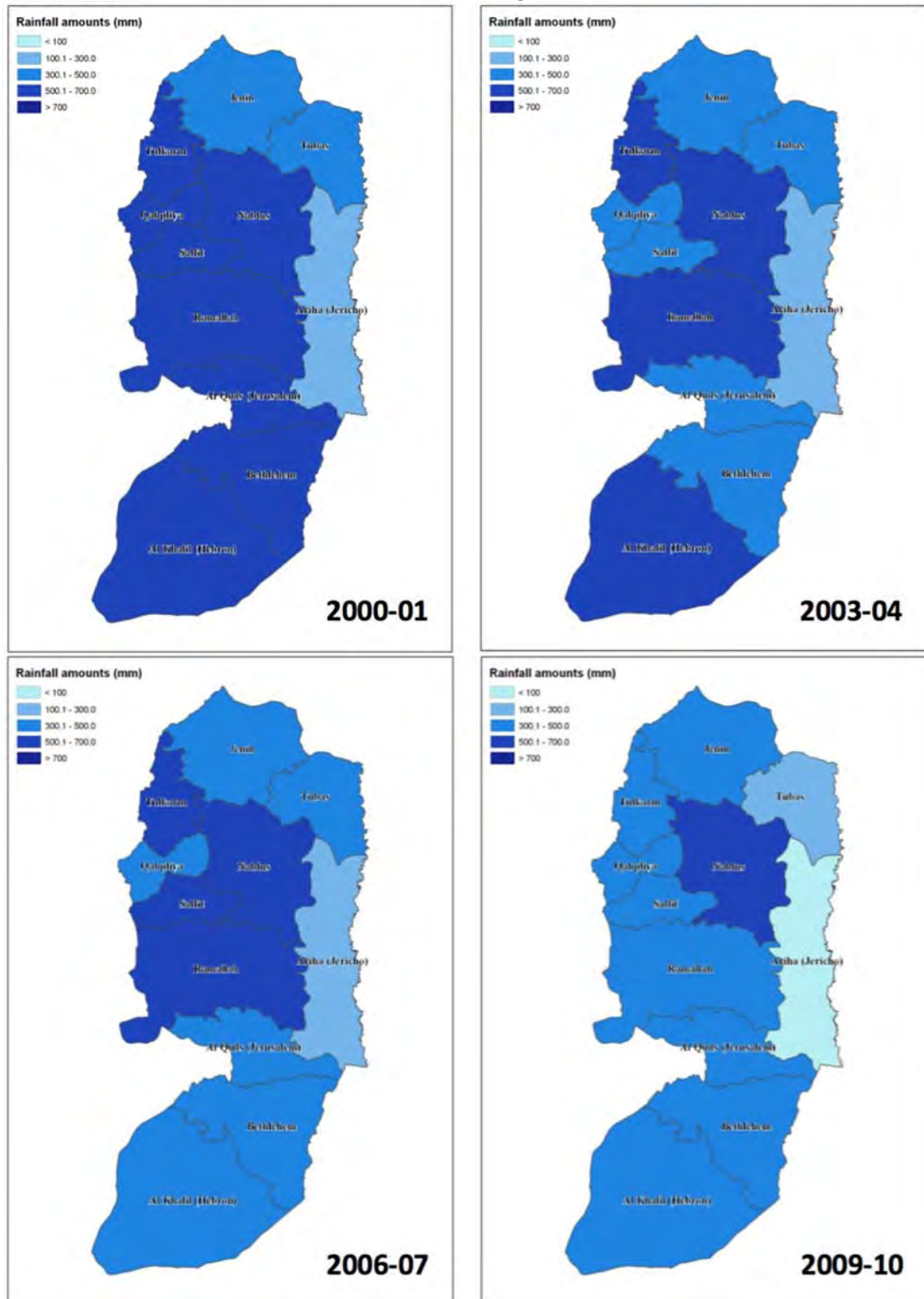
⁹² Available via http://www.grid.unep.ch/products/4_Maps/palestine_aquiferb.jpg

Map 5: Mean temperature at the West Bank, at governorate level⁹³



⁹³ Richard, M. & Issac, J. (2012). Analysis of climatic variability and its environmental impacts across the occupied Palestinian territory. Applied Research Institute - Jerusalem.

Map 6: Total annual rainfall at the West Bank, governorate level⁹⁴



⁹⁴ Richard, M. & Issac, J. (2012). Analysis of climatic variability and its environmental impacts across the occupied Palestinian territory. Applied Research Institute - Jerusalem.

Annex: List of projects in Palestinian Territories

Name of project	Name of fund/ donor	Implementing agency	Amount approved	Amount disbursed	Time frame
Construction of a waste water treatment plan in the Khan Younis governorate ⁹⁵	Government of Japan, Islamic Development Bank, UNDP	UNDP/PAPP	Approx. USD 57 million	USD 2.8 million	2015–2020
Community resilience and development programme (CRDP) ⁹⁶	Sida, Austrian Development Agency, Norway, UK (round 1)	UNDP/PAPP	USD 17,889,619		2012–2017
Enhancing capacities of Palestinian institutions in mainstreaming environment and climate change	Government of Belgium	UNDP/PAPP	€1,455,550		2013–2016
Restoring water facilities in Area C of the West Bank ⁹⁷	Government of Japan	UNDP/PAPP			2014–2016
Resilience against natural disasters ⁹⁸	Government of Iceland	UNDP/PAPP	USD 455,000		2014–2015
Development of high resolution hydro climate model, fostering cooperation on water management between Palestinian, Jordanian and Israeli water authorities ⁹⁹	EU	UNDP/PAPP	USD 411,790		2013–2016

⁹⁵ http://www.ps.undp.org/content/papp/en/home/operations/projects/environment_and_energy/KYWWTP.html

⁹⁶ Part of the project is focusing on climate change. http://www.ps.undp.org/content/papp/en/home/operations/projects/democratic_governance/community-resilience-and-development-programme.html

⁹⁷ http://www.ps.undp.org/content/papp/en/home/operations/projects/environment_and_energy/rehabilitation-of-water-facilities-project-in-area-c-of-the-west.html

⁹⁸ http://www.ps.undp.org/content/papp/en/home/operations/projects/environment_and_energy/resilience-against-natural-disasters.html

⁹⁹ http://www.ps.undp.org/content/papp/en/home/operations/projects/environment_and_energy/fostering-cooperation-on-water-management-between-palestinian--j.html

Name of project	Name of fund/ donor	Implementing agency	Amount approved	Amount disbursed	Time frame
Improving water supply services (in terms of quantity and quality) to the residents of Rafah and Northern Governorates in the Gaza strip ¹⁰⁰	Government of Japan	UNDP/PAPP	USD 5.424.106	Approx. USD 2,000,000	2010–2013
Water sector capacity building project, additional financing ¹⁰¹	WorldBank	PWA, Water Regulatory Council	USD 2,000,000		Approved 2015
Hebron regional wastewater management project, phase 1 ¹⁰²	WorldBank	PWA	USD 4,500,000		Approved 2015
GZ Water sector capacity building ¹⁰³	WorldBank	PWA	USD 3,000,000		Approved 2011
Adapting to climate change ¹⁰⁴	GIZ, Energy and climate fund	MoA	N/A		2014–2018

¹⁰⁰ http://www.ps.undp.org/content/papp/en/home/operations/projects/environment_and_energy/emergency-water-supply-and-rehabilitation-programme.html

¹⁰¹ http://www.worldbank.org/en/country/westbankandgaza/projects/all?sector_exact=General+water%2c+sanitation+and+flood+protection+sector&qterm=&lang_exact=English&status_exact=Active

¹⁰² http://www.worldbank.org/en/country/westbankandgaza/projects/all?sector_exact=General+water%2c+sanitation+and+flood+protection+sector&qterm=&lang_exact=English&status_exact=Active

¹⁰³ http://www.worldbank.org/en/country/westbankandgaza/projects/all?sector_exact=General+water%2c+sanitation+and+flood+protection+sector&qterm=&lang_exact=English&status_exact=Active

¹⁰⁴ <https://www.giz.de/en/worldwide/25218.html>