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DRR PLATFORM
Climate & Disaster Resilience

FACTSHEET

Climate Projections in Project Design: Getting started

This factsheet identifies key sources of climate projections, and provides development practitioners with guidance on how to use these projections in project planning and implementation.

Climate projections – where they come from and what they tell us

The extensive assessment reports of the Intergovernmental Panel on Climate Change (IPCC) use global and regional climate models and scenarios of future greenhouse gas (GHG) emissions to produce climate projections at various scales. The models run on supercomputers that simulate the complex processes that define climate conditions. The resolution of global models is typically quite coarse, and the regional models, which apply to smaller areas and produce greater detail, rely on global models for input data and therefore are not necessarily more reliable or more accurate. Analysts select and process data on climate parameters – such as temperature, humidity and wind speed – from these climate models, and develop climate projections for specific locations and at different levels on the Earth's surface and in the atmosphere and oceans.

The IPCC bases its scenarios for future greenhouse gas concentrations on assumptions about driving forces such as socioeconomic development and energy use and their relationships. The scenarios range from a best-case (extensive action is taken to reduce emissions levels) to the worst-case (emissions keep rising with no action taken to reduce them).[1]

Climate projections provide information on the probable future climate, such as mean temperature and mean precipitation, and provide estimates on what impacts climate change may have on sectors such as agriculture, energy or health. Climate projections are plausible simulated responses of the climate system, and are not predictions in the way that weather forecasts are. The timescale of climate projections varies, usually within the range of 10-100 years.

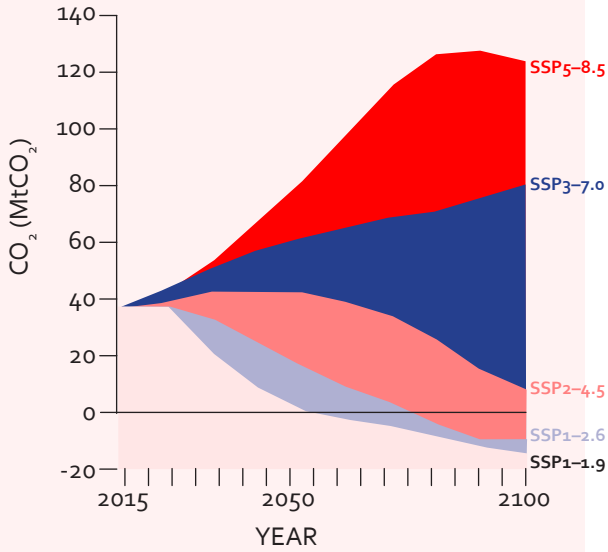
1. The main scenarios used by the IPCC are known as Shared Socioeconomic Pathways (SSPs) and Representative Concentration Pathways (RCPs).

IPCC emission scenarios

In its 6th Assessment Report, the IPCC uses five new emissions scenarios to project the climate response to a range of greenhouse gas, land use and air pollutant futures:

- Very high GHG emissions (**SSP5–8.5**) and CO_2 emissions that roughly double from current levels by 2050
- High GHG emissions (**SSP3–7.0**) and CO_2 emissions that roughly double from current levels by 2100
- Intermediate GHG emissions (**SSP2–4.5**) and CO_2 emissions remaining around current levels until the middle of the century
- Low GHG emissions (**SSP1–2.6**) and CO_2 emissions declining to net zero after 2050
- Very low GHG emissions (**SSP1–1.9**) and CO_2 emissions declining to net zero around 2050

(From CACIP Review Issue 2)



Climate projections in project design

Future climate conditions, including climate extremes, will affect the sustainability of any development and humanitarian project. Therefore, planners should ensure that projects increase climate resilience and strengthen adaptive capacity and that project gains are not undermined by long-term climate trends. For projects already underway, adaptive management based on climate projections can make them more robust in the face of climate change.

The modelled data is in general presented at a resolution of 100km x 100km. While climate projections tend to be produced at scales larger than the typical project scope, climate models still provide plenty of useful information about future climate trends to help make planning decisions.

Key steps for including climate projections in projects

1

ASSESS THE CURRENT CLIMATE RISK

in the project area using a hazard-vulnerability-capacity assessment or similar tool.[2]

2

DEFINE THE RELEVANT TIME HORIZON

for the decisions being made today within the scope and focus the project.

For example: For annual crops the time horizon may be the next season, for farm level planning it may be the next 5 years; for plantation crops, 20 years; for forests, 50 years or longer; and for irrigation infrastructure, 50–80 years.

3

DETERMINE THE RELEVANT CLIMATE INFORMATION

for a project based on the climate risk and time horizon.

For example: Consider the suitability of a specific crop in the project area under climate change, how the risk of flash floods will change over time, and the need for, or availability of, water for irrigation in the future.

4

ASSESS FUTURE CLIMATE RISK

by accessing information from available climate projections (see sources below). Remember to acknowledge uncertainty in future projections, and to identify the sources of uncertainty that influence the climate projections in this time horizon.

For example: Information from climate projections needs to be combined with crop models that provide information on how a given crop performs under higher temperatures or precipitation.

For programmes with a long-term time horizon, consider different IPCC emission scenario possibilities.

5

INTERPRET INFORMATION

to consider how trends in temperature, precipitation and impacts on sectors could affect communities, livelihoods, the environment, infrastructure and services in the project area, and project activities overall.

Note that if there are altitude differences in the project region or other relevant geographic factors that could have influence on the local climate, interpreting climate projections should be done with additional caution.

6

IDENTIFY AND PRIORITIZE ACTIONS

and integrate information into project plans by developing actions that increase resilience, reduce vulnerability of local communities to longer-term climate trends, and support adaptation to current and future climate conditions.

For example: Promote drought-resistant crops in an area expected to become hotter and drier.

7

COLLABORATE AND SHARE

by maintaining contact and dialogue with relevant national institutions, networks and academia throughout the process.

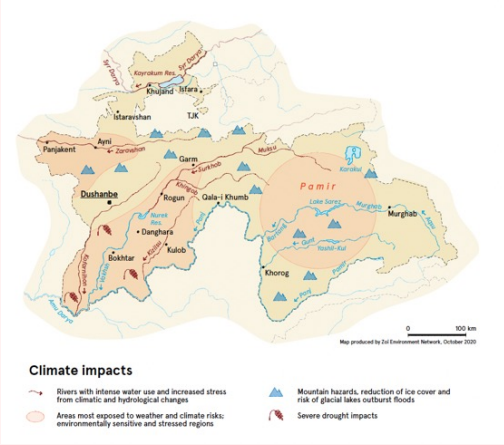
2. For risk assessment tools, see: Disaster risk reduction / climate change adaptation mainstreaming guidance. Overview of key tools.

Helpful hints

-› When planning or reviewing a project, consider accessing the available sources of climate projections and information relevant to the specific project and region. In an agriculture project, for example, projections of increasing temperatures and changing rain patterns can inform decisions about future water availability and the suitability of certain crops.

-› Remember to acknowledge the degree of uncertainty of climate projections. The conclusions will vary based on factors such as future greenhouse gas emissions and natural variability of the climate system. The uncertainty associated with climate projections increases with time, but it is nevertheless important to consider possible climate futures when making decisions with long-term implications. Agriculture and forestry projects, for example, can entail the analysis of the ranges of temperature and precipitation within which a specific crop or tree can grow, and the climate projections can help planners determine the selection of crop and tree species.

-› Maps can provide overviews of key climate projection information, and can communicate information to project teams and stakeholders. They can combine information on changes in climate (temperature, precipitation, sea-level rise, etc.), changes in climate-related hazards (floods, drought, etc.), and vulnerability to climate change impacts (nature, crops, economies, human health).



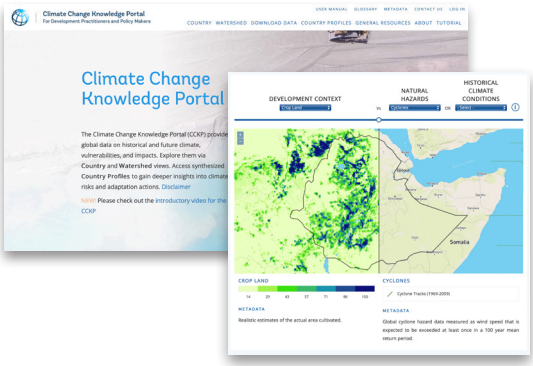
Example of a map showing an overview of selected climate impacts for Tajikistan

Example of a map showing an overview of selected climate impacts for Chu and Talas river basins.

Sources for climate projections

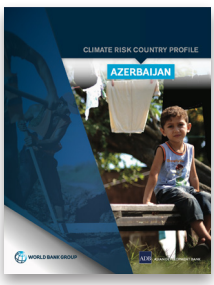
Several open-access portals and reports analyse and interpret data on climate projections combining future climate change and expected impacts. We suggest the following sources.[3]

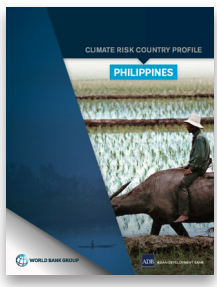
Climate Change Knowledge Portal of the World Bank



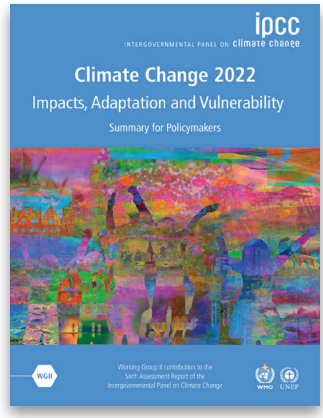
This extensive portal uses the latest IPCC reports and datasets to provide data and analysis on historical and future climate, vulnerability (with a focus on natural hazards), and impacts at the country, region and watershed scales. Information is available, for example, on the number of frost days, or days with precipitation > 20 mm, and on land use and hazard risks.

Climate Risk Country Profiles provide deeper insights by country.





Assessments of the Intergovernmental Panel on Climate Change

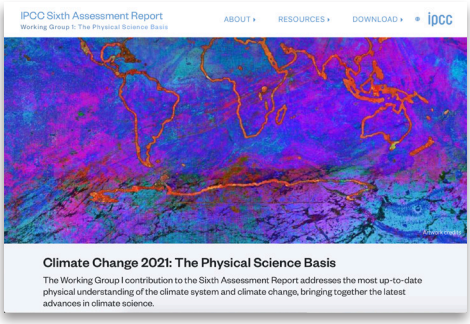


Climate Change 2022: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the IPCC Sixth Assessment Report. This report assesses the impacts of climate change, and considers ecosystems, biodiversity, and human communities at the global and regional levels.

Separate **regional chapters or cross-chapter papers** assess climate change impacts and risks, vulnerability, and barriers and options for adaptation and climate resilient development. These chapters are available for **Africa, Asia, Australasia, Central and South America, Europe, North America, Small Islands, the Mediterranean, Cities and Settlements by the Sea, Deserts and Semi-arid Areas, Mountains, Polar Regions, and Tropical Forests.**

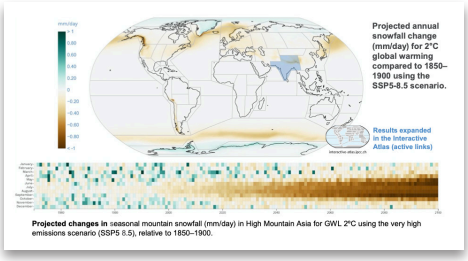
Additionally, **regional and crosscutting fact sheets** are available, providing a snapshot of the key findings of the relevant chapters.

3. A list of additional sources is available here: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fdrrplatform.org%2Fwp-content%2Fuploads%2F2022%2F08%2FAdditional-sources-for-information-on-climate-projections.docx&wdOrigin=BROWSELINK



Climate Change 2021: The Physical Science Basis. Working Group I Contribution to the IPCC Sixth Assessment Report.
This report presents the most up-to-date physical understanding of the climate system and climate change, combining multiple lines of evidence from paleoclimatology, observations, and global and regional climate simulations.

Regional fact sheets summarize information on regional changes, temperature and precipitation. These fact sheets are available for **Africa, Asia, Australasia, Central and South America, Europe, North and Central America, Mountains, Oceans, Polar Regions, Small Islands, and Urban Areas**.



IPCC Interactive Atlas
The Atlas allows for regional and temporal exploration of observed and projected climate data used in the Sixth Assessment Report. The Regional Information section allows to generate maps and regionally aggregated products based on key datasets. The Regional Synthesis section provides qualitative information on about changes in climatic impact-drivers in categories such as heat and cold.

Factsheets for Africa by the Climate and Development Knowledge Network (CDKN)

CDKN factsheets distil data, trends and analyses from the Intergovernmental Panel on Climate Change Sixth Assessment Report with a focus on what is most relevant to Africa's subregions.
IPCC Sixth Assessment Report: New factsheet for Decision-makers in Southern Africa
IPCC Sixth Assessment Report: New factsheet for Decision-makers in West Africa
IPCC Sixth Assessment Report: New factsheet for Decision-makers in Central Africa

National sources

National meteorological services and national disaster risk management and climate change institutions provide additional information, as do plans such as National Adaptation Plans. National climate and meteorological services downscale climate models and combine weather forecasts with long-term trends to provide locally action-able information.