



IMPACT2C – An introduction



Limiting global warming to less than +2 °C relative to preindustrial levels is one of the major challenges ahead of us.

IMPACT2C examined the impacts of +2 °C global warming on Europe and key vulnerable regions in Africa (Nile and Niger river basins), Bangladesh and the Maldives. This four-year multi-disciplinary research project (www.impact2.eu) started in October 2011 and was funded by the European Commission's Seventh Framework Program under the grant agreement No. 282746. Researchers from 29 different institutions and 17 countries worked together within this project. The project integrated the expertise of climate scientists, sectorial impact researchers with both physical and economical backgrounds, and local specialists from the regions.

If global warming reaches +2 °C, there are likely to be important impacts for the areas that warm faster than the global average or for highly vulnerable regions such as small island states and major deltas.

In this context, the following scientific questions were tackled:

- What might be the potential impacts of a +2 °C global warming compared to the preindustrial period for various regions of the globe, and economic sectors?
- What are the differences between a +2 °C and a +3 °C global warming?
- What might be prevented if global warming is limited to +2 °C rather than +3 °C?

A comprehensive assessment of the impacts and costs of a temperature increase of +2 °C on different sectors such as water, energy, agriculture, infrastructure and health was undertaken. Project partners introduced a number of innovation approaches. A sampling method to provide information across the matrix, taking into account the combination of emission scenarios, climate and impact models, and socio-economic pathways allowed the consideration of uncertainty in any subsequent analysis.

The **key messages** of the IMPACT2C project can be summarized as follows:

- A global warming by 2 °C substantially affects a wide range of sectors and regions throughout Europe. Some regions or sectors will benefit from a future warming, but some will experience disadvantages.
- To assess the impacts of climate change on specific sectors, cross-sectorial relationships have to be included into the analysis.
- In most regions of Europe, the projected regional warming is more pronounced than the global mean warming. Projections for annual mean precipitation show wetter conditions in northern Europe and drier conditions in southern Europe.
- Under a 2 °C global warming, a European-wide increase in the frequency of extreme events is expected. Heat waves are projected to double while extreme precipitation events tend to become more intense.
- A limitation to 2 °C global warming will not stop sea-level rise due to the delayed reaction of the oceans. Therefore costs due to coastal flooding will incur even with adaptation measures.
- Bangladesh and the low-lying islands like Maldives are expected to feel the consequences of climate change, due to the continuous rise of sea-levels enhancing the risk for storm surges and flooding.
- For West and East Africa, the warming is above the global temperature increase. West Africa could experience a modest increase in rainfall, whereas for East Africa no clear trend is projected.

In summary, IMPACT2C provided easily accessible climate-related information to policymakers, media and other interested parties. The project results were published in a series of the Policy Brief Notes and the IMPACT2C web atlas (www.atlas.impact2c.eu) was produced to provide background material for the development of recommendations on possible adaptations strategies.

The IMPACT2C special issue contains 9 papers displaying research findings from the project. They cover regional climate changes (Fox et al., 2017), impacts on several sectors like energy (Damm et al., 2017), winter tourism (Damm et al., 2017b), agriculture (Sakalli et al., 2017; Willigies et al., 2017) and health (Hunt et al., 2017) as well as a description of the IMPACT2C web atlas (Preuschmann et al., 2017). In addition, a case study for Bangladesh (Zaman et al., 2017) and a multi-model climate response over tropical Africa (Déqué et al., 2017) are presented.

2 °C more – compared to pre-industrial levels – may not sound like much, but the implications would be major.

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