Cope with climate change through knowledge

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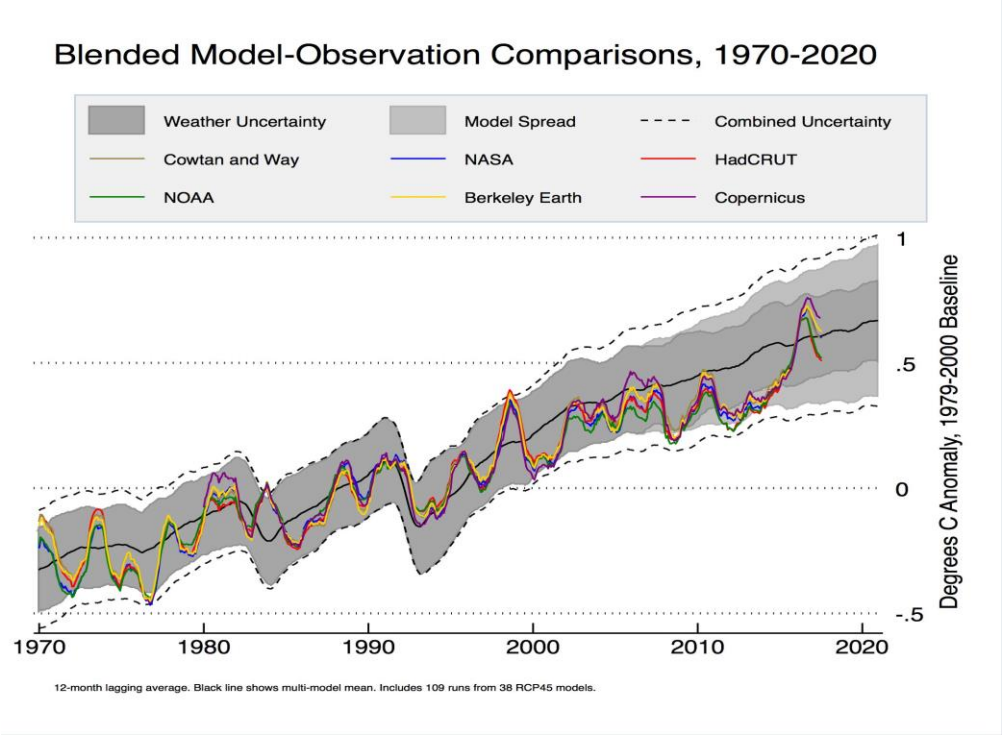
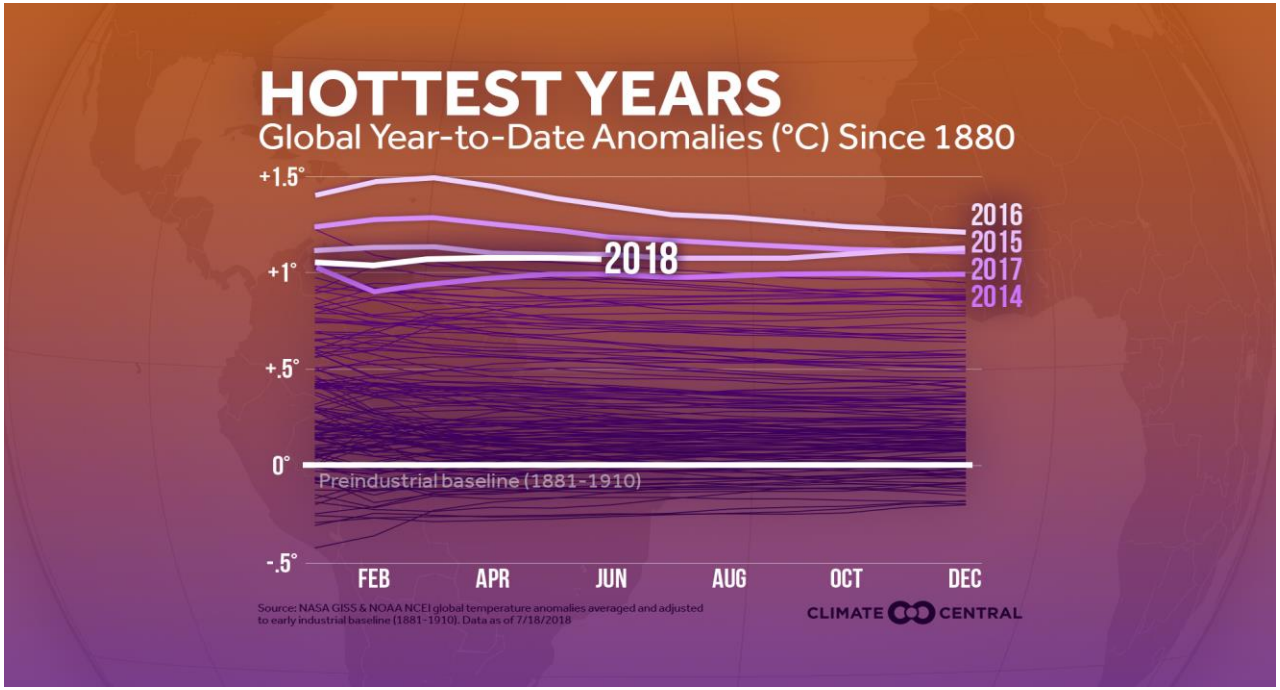
EAAP 2018

Consiglio Nazionale delle Ricerche
Istituto di Biometeorologia



The world has warmed **more than one degree Celsius** since the Industrial Revolution. The Paris climate agreement (2016) hoped to restrict warming to two degrees.



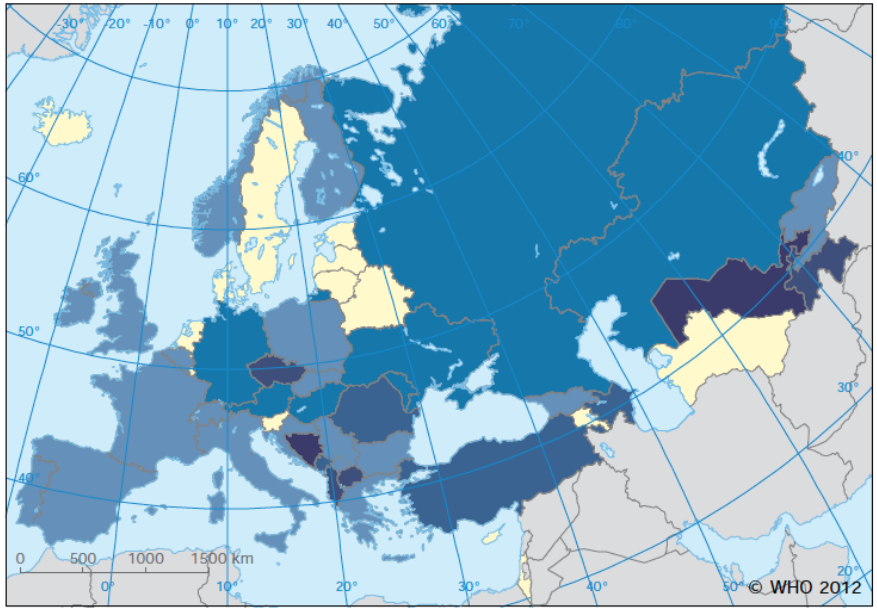
The world has warmed **more than one degree Celsius** since the Industrial Revolution. The Paris climate agreement (2016) hoped to restrict warming to two degrees.

The climate scientist James Hansen has called **two-degree** warming “a prescription for long-term disaster.”

Three-degree warming is a prescription for short-term disaster.

[NWTimes.com]

Map 4.11 Number of people affected by flooding per million population in the WHO European Region (annual average 2000–2011)



People (per million) affected by flood and wet mass movement (2000–2011)

- 0
- 1–2 500
- 2 500–5 000
- 5 000–10 000
- 10 000–50 000
- > 50 000

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

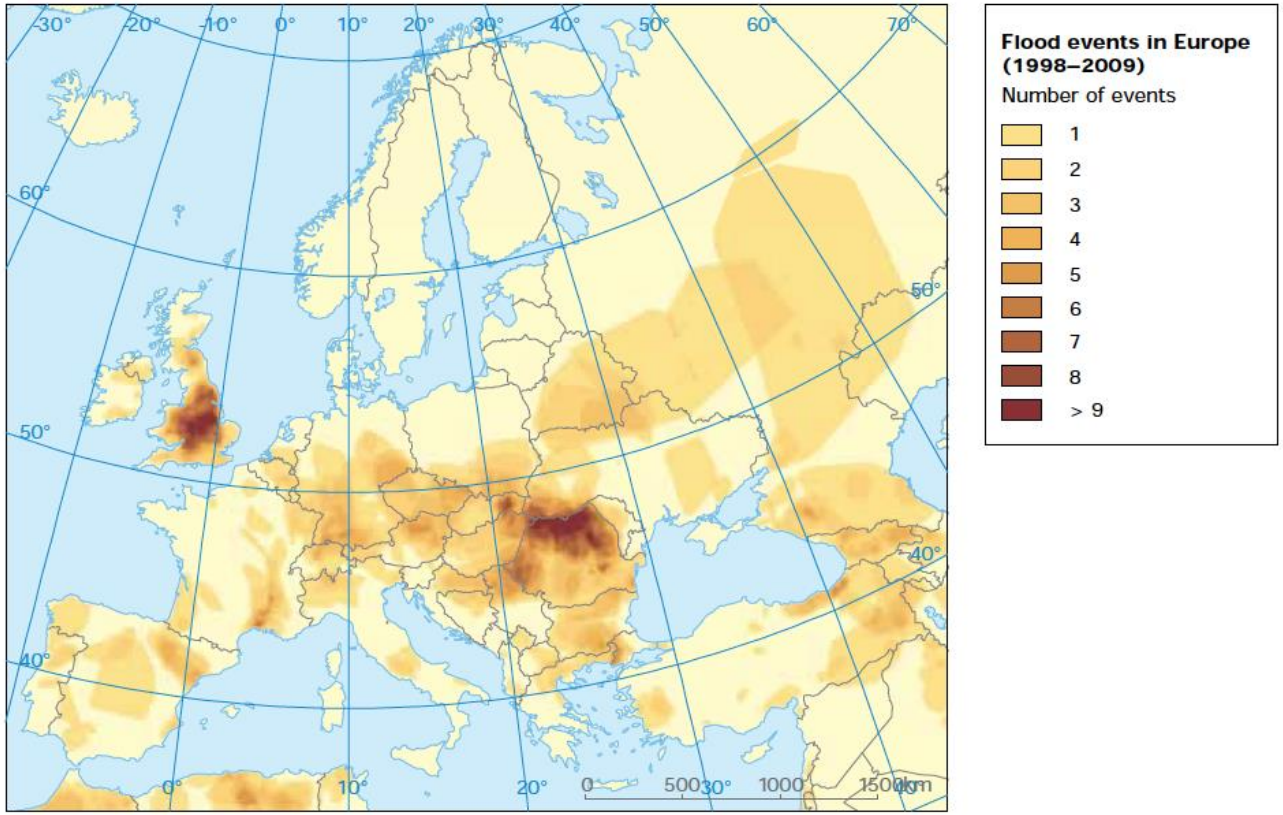
Note: 'People affected', as defined in EM-DAT, are people who require immediate assistance during a period of emergency, including displaced or evacuated people.

GIS data source acknowledgement: Countries and Major Rivers, ESRI Data & Maps, © Environmental Systems Research Institute Inc.

EM-DAT/CRED and the Dartmouth Flood Observatory were analysed to determine the flooded countries in the WHO European Region and the impact of these floods (see text for details).

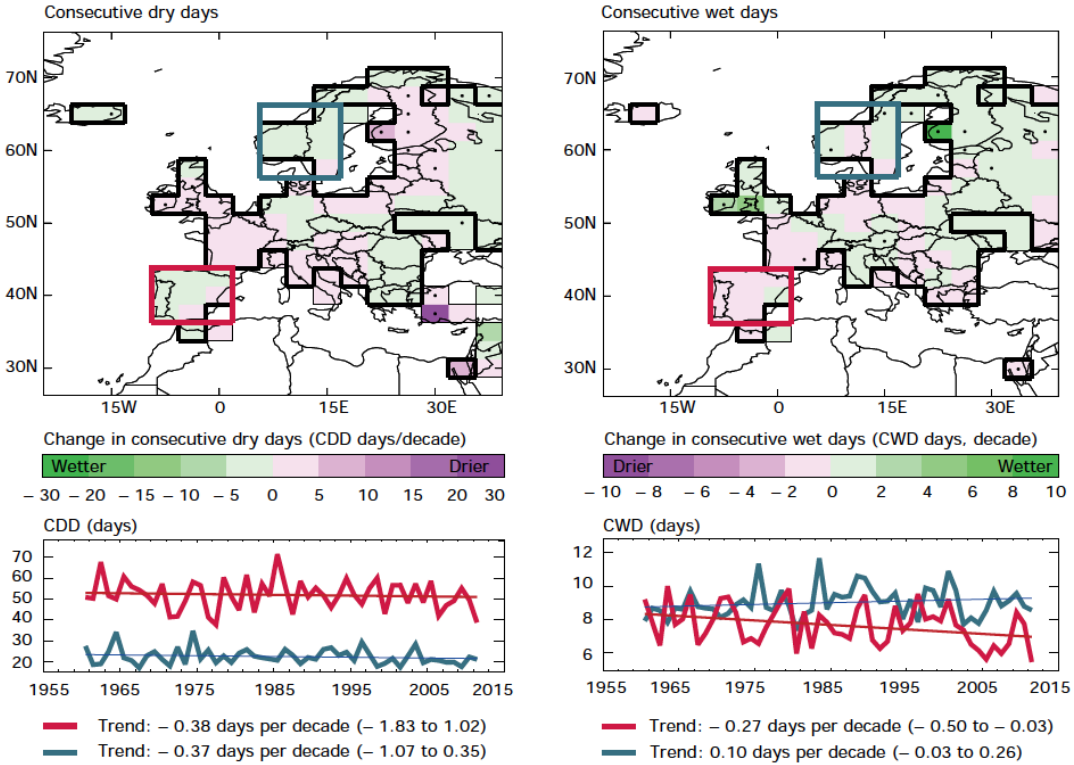
Source: WHO and HPA (forthcoming): Floods: Health effects and prevention in the WHO European Region.

Map 3.7 Occurrence of major floods in Europe (1998–2009)



Source: EEA, based on Dartmouth Flood Observatory, 2012.

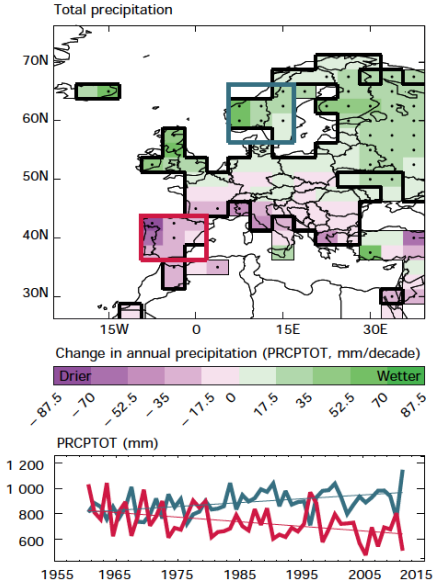
Map 2.7 Trends in consecutive wet days and consecutive dry days (1960–2012)



Note: High confidence in a long-term trend is shown by a black dot (if the 5th to 95th percentile slopes are of the same sign). Boxes which have a thick outline contain at least three stations. Area averaged annual time series of percentage changes and trend lines are shown below each map for one area in northern Europe (blue line, 5.6 to 16.9 °E and 56.2 to 66.2 °N) and one in south-western Europe (red line, 350.6 to 1.9 °E and 36.2 to 43.7 °N).

Source: HadEX dataset, updated with data from the ECA&D dataset.

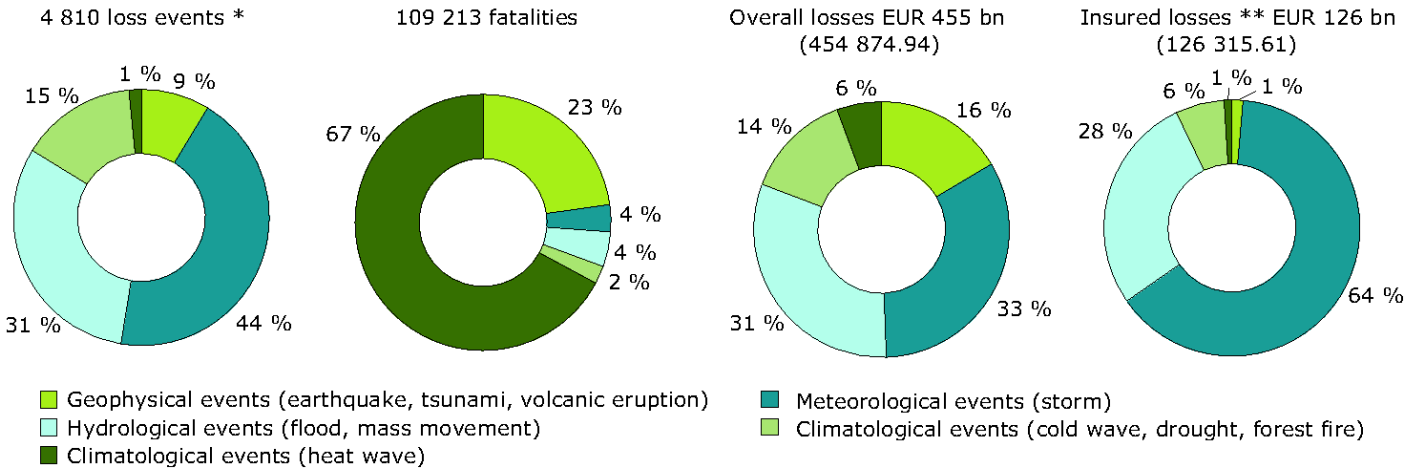
Map 2.5 Trends in annual precipitation across Europe (1960–2012)



Note: The trends are calculated using a median of pairwise slopes algorithm. Black dots represent high confidence in the sign of the long-term trend in the box (if the 5th to 95th percentile slopes are of the same sign). Boxes which have a thick outline contain at least three stations. Area averaged annual time series of percentage changes and trend lines are shown below each map for one area in northern Europe (blue line, 5.6 to 16.9 °E and 56.2 to 66.2 °N) and one in south-western Europe (red line, 350.6 to 1.9 °E and 36.2 to 43.7 °N).

Source: HadEX dataset, updated with data from the ECA&D dataset.

Climate-related European disasters 1980-2011



Source: European Environment Agency

http://www.eea.europa.eu/data-and-maps/indicators/direct-losses-from-weather-disasters-1/assessment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WEATHER
AHEAD


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ALBINIA

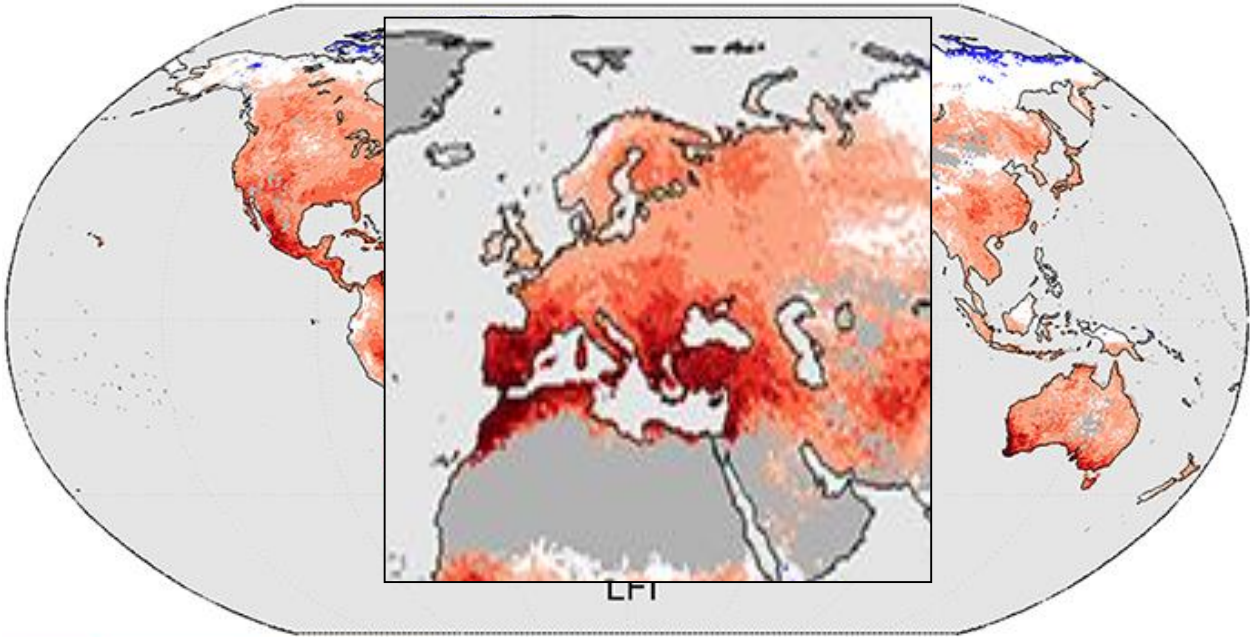
Spain drought, The Barrios de Luna reservoir, 2017.

France drought, 2016

Summer drought, River Elbe, Germany, 2015.

Italy drought, 2017

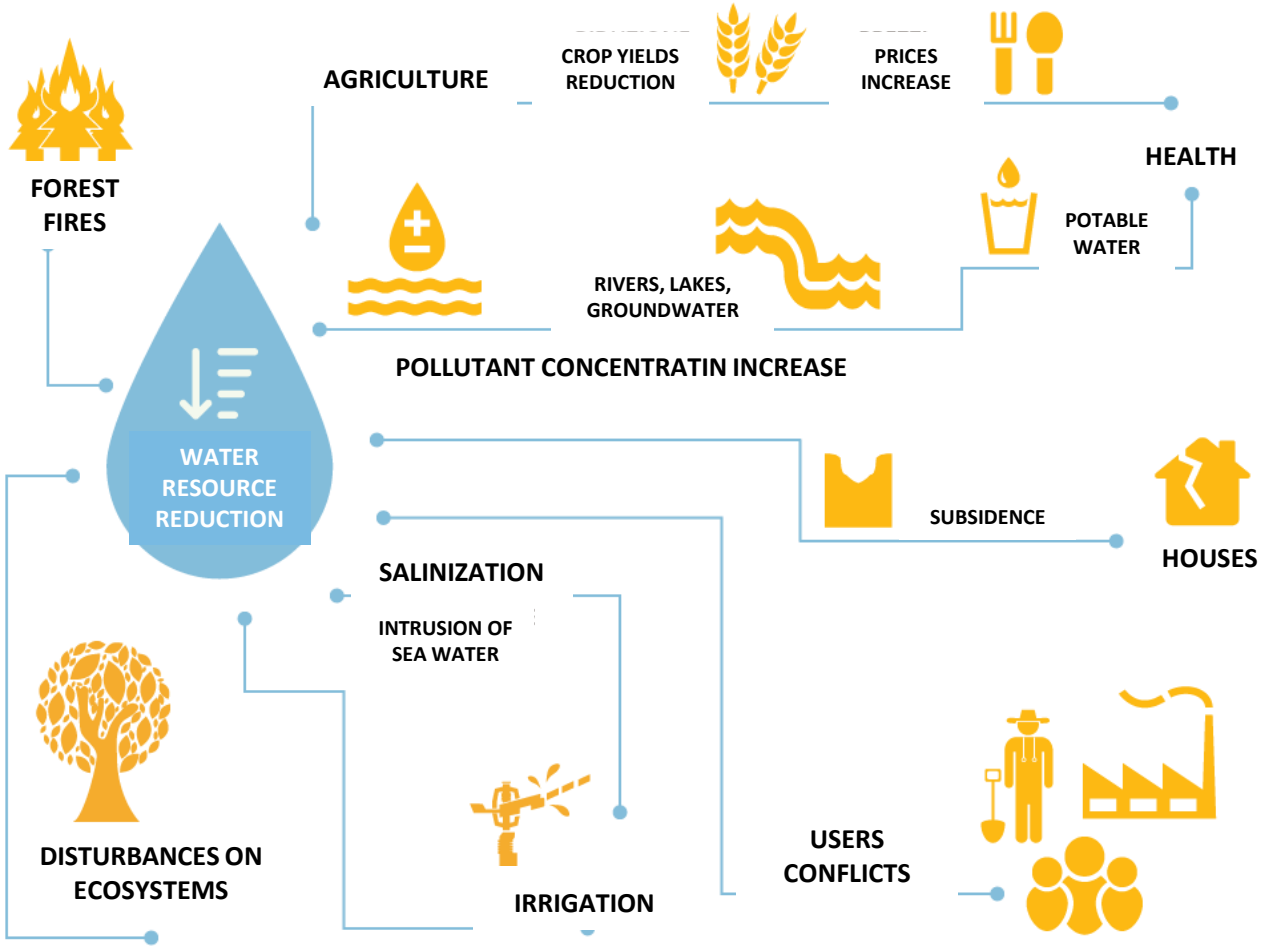
Future drought projections: 2080s



Mean change frequency low flow periods

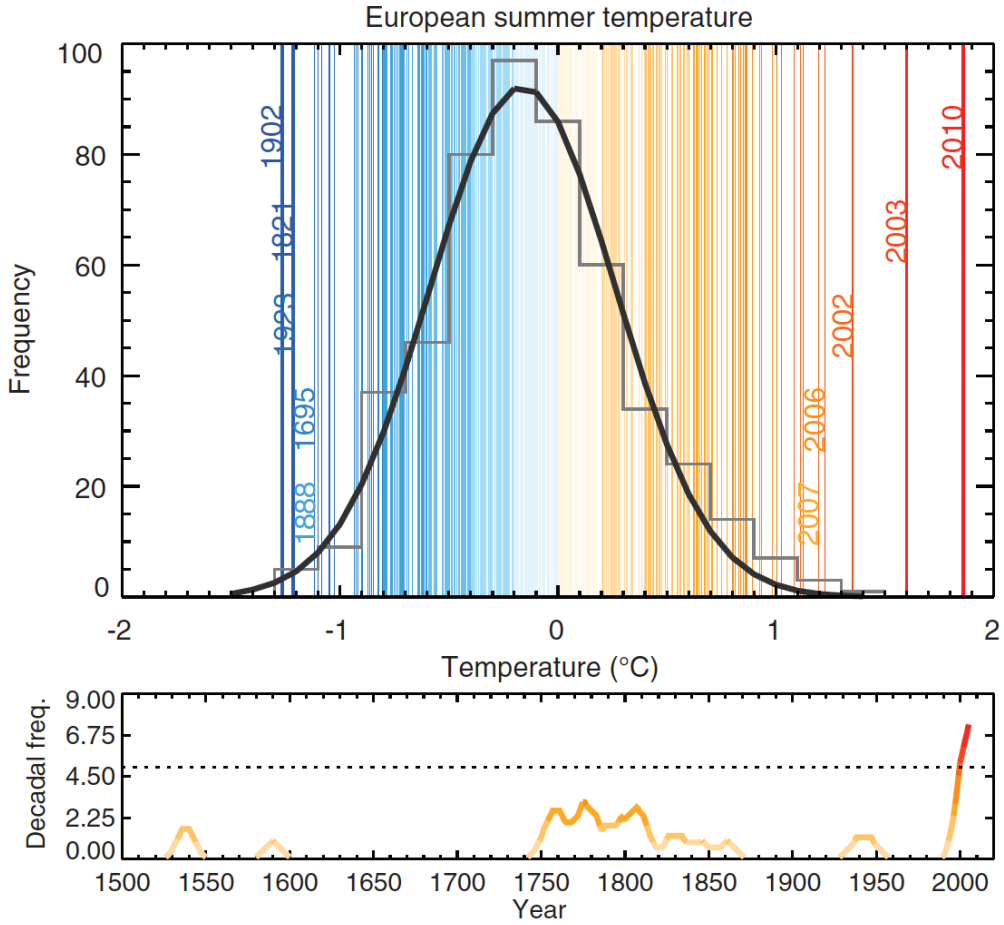
Prudhomme et al., 2014, PNAS, 10.1073/pnas.1222473110
Giuntoli, et al. 2015, ESD, doi:10.5194/esd-6-267-2015

IMPACTS OF WATER SCARCITY

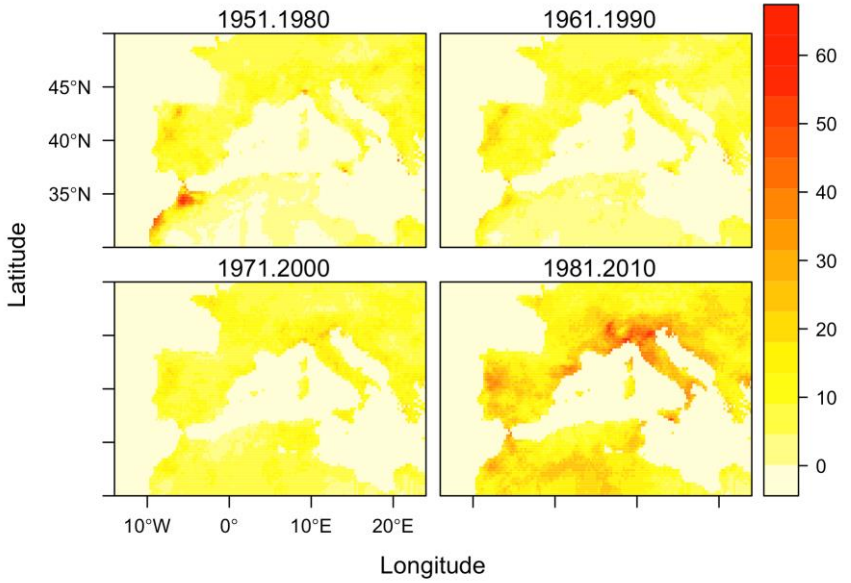


Content Design: Ramona Magno - Visual Design: Elena Rapisardi

Icons by the Noun Project: Garrett Knoll, Richard Cordero, Korawan M., Nikita Kozin, Jason Dilworth, Richard Pasqua



Barriopedro, D., Fischer, E. M., Luterbacher, J., Trigo, R. M., & García-Herrera, R. (2011). The hot summer of 2010: redrawing the temperature record map of Europe. *Science*, *332*(6026), 220-224.



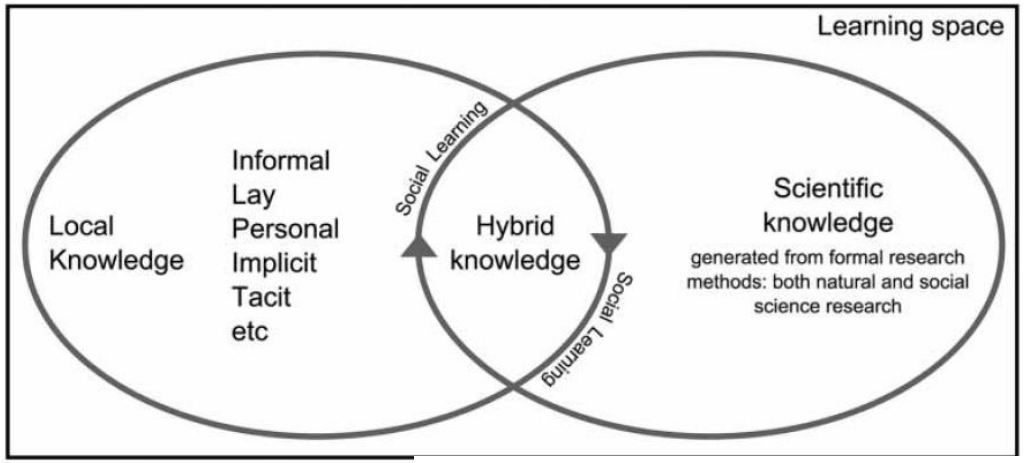
Pasqui M., Di Giuseppe E., *2016*: Capitolo 1 "Evidenze dei cambiamenti climatici nella variabilità della temperatura in Italia" in Stato, prospettive e fabbisogni della ricerca italiana in zootecnia nel contesto dei cambiamenti climatici, *Quaderno IV_2015, Supplemento a "I Georgofili. Atti della Accademia dei Georgofili"* Anno 2015 - Serie VIII - Vol. 12

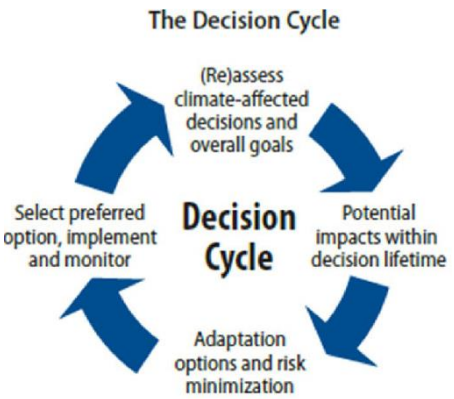
The **climate change** challenge is **unprecedented** for humanity and it **requires a deep change** in the way of thinking and acting at different levels

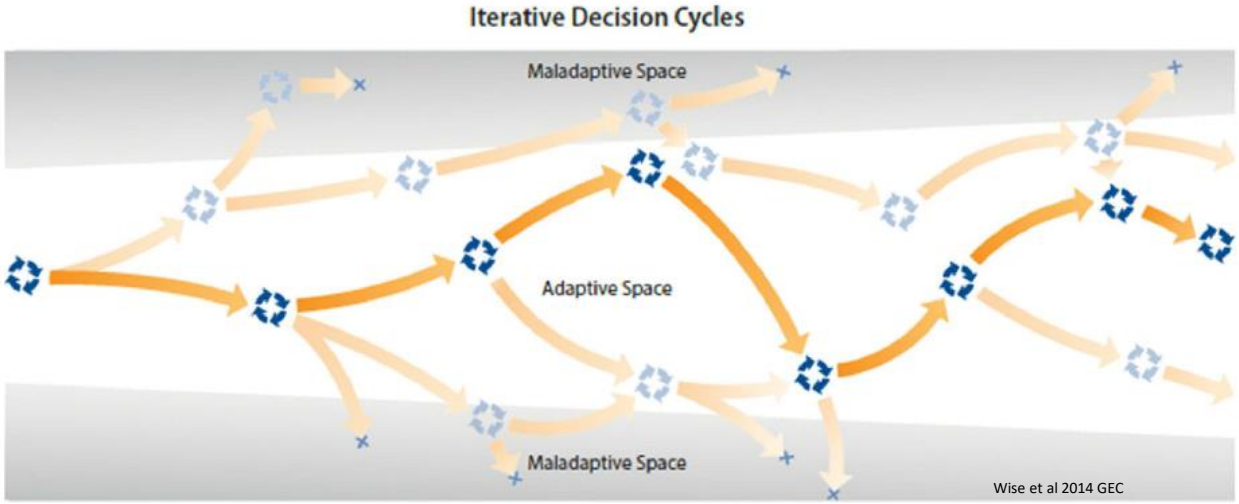
Now **we know** what future scenarios would mean for agro-ecosystems, landscapes, coastlines, agricultural yield, local and global economies. But **we still have to comprehend** what those future scenarios might mean for **us**.

To develop an effective climate change adaptation strategy a brand **new process** of thinking and learning is needed between researchers, citizens, technicians and policy makers, fuelled by scientific research

Hybrid knowledge rationale

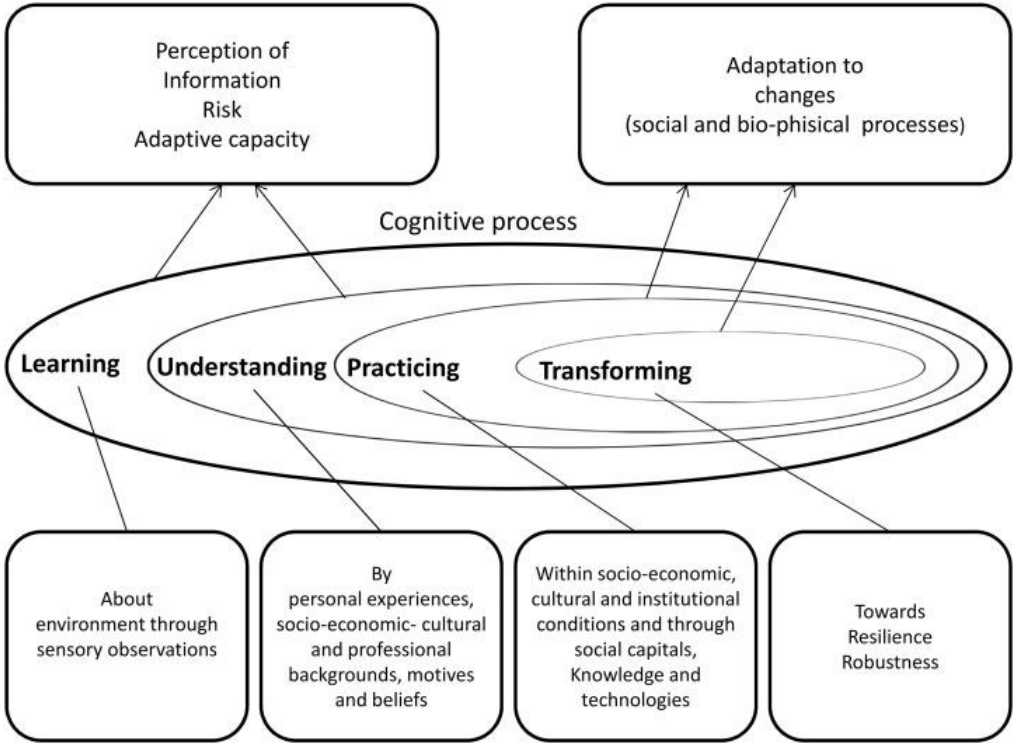






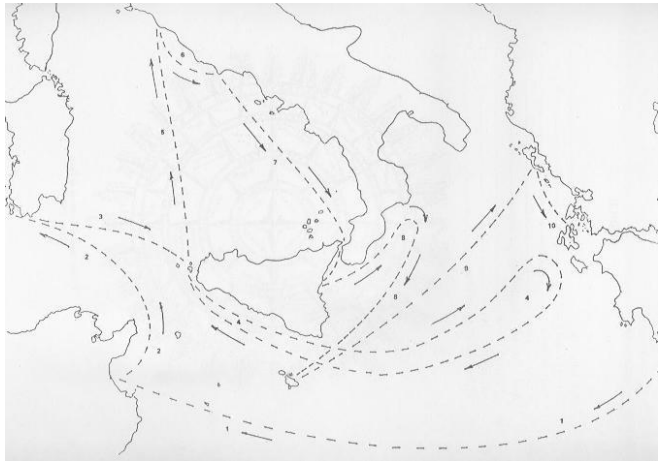
Wise et al 2014 GEC

Conceptual framework of perceiving and adapting process.

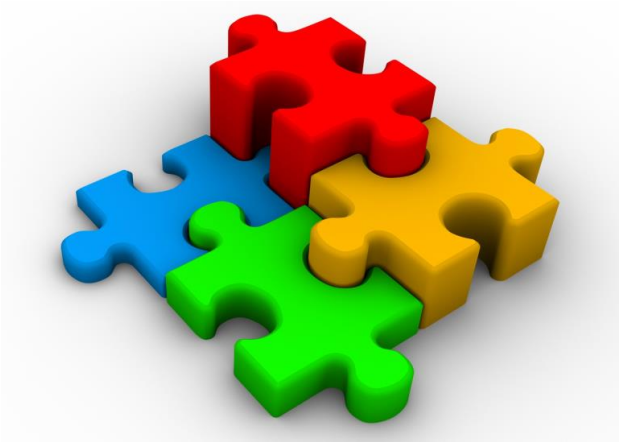


Nguyen T., et al., 2016 "Perceiving to learn or learning to perceive? Understanding farmers' perceptions and adaptation to climate uncertainties",
Agricultural Systems, Volume 143, 2016, 205–216,
http://dx.doi.org/10.1016/j.agsy.2016.01.001

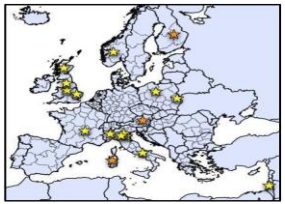
Climate change adaptation must be understood not as a state to be reached, but as a continuous transformation which implies continuous changes at different levels ...
It isn't a route to follow, but a **path that continually changes** ...



Actions should not be seen as an interlocking set of pieces (fitting-to approach) but as a continuous co-evolution process.



Ison, 2010, Systems practice: how to act in a climate change world, Springer



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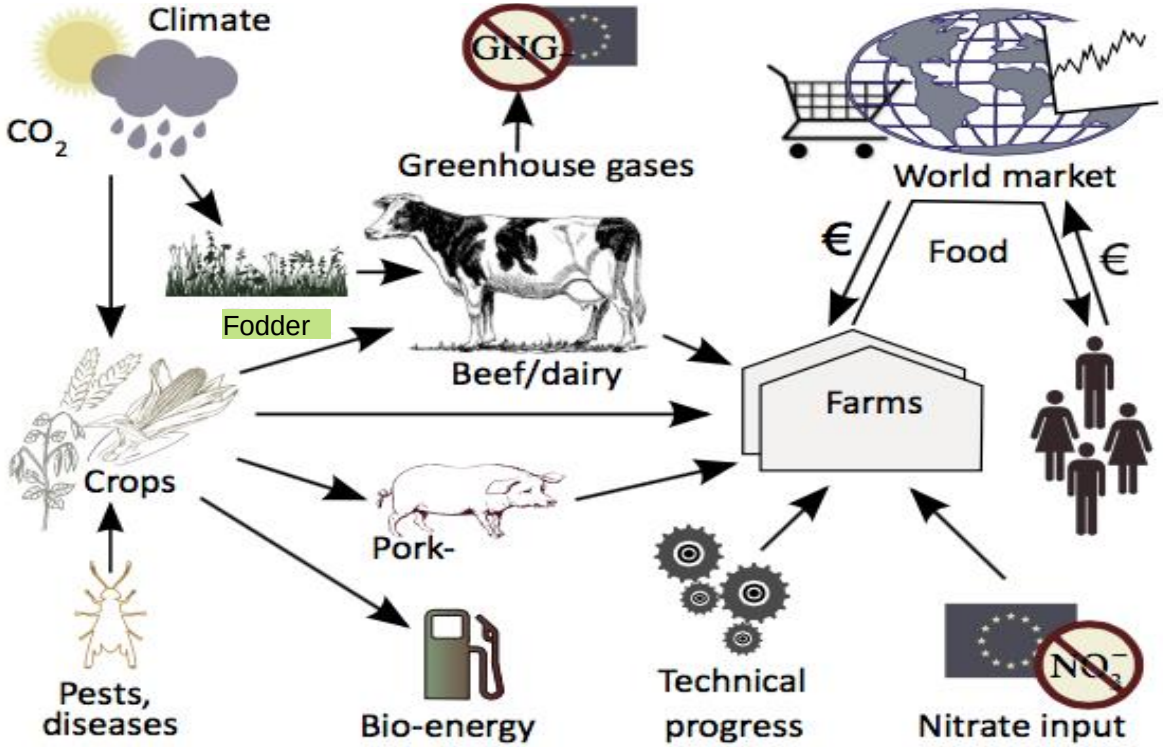
Climate
CO_2
GHG-
Greenhouse gases
World market
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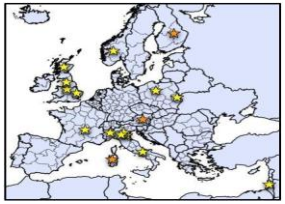
Food
€
Fodder
Beef/dairy
Farms
Crops
Pork-
Pests,
diseases
Bio-energy
Technical
progress
NO_3^-
Nitrate input

MACSUR



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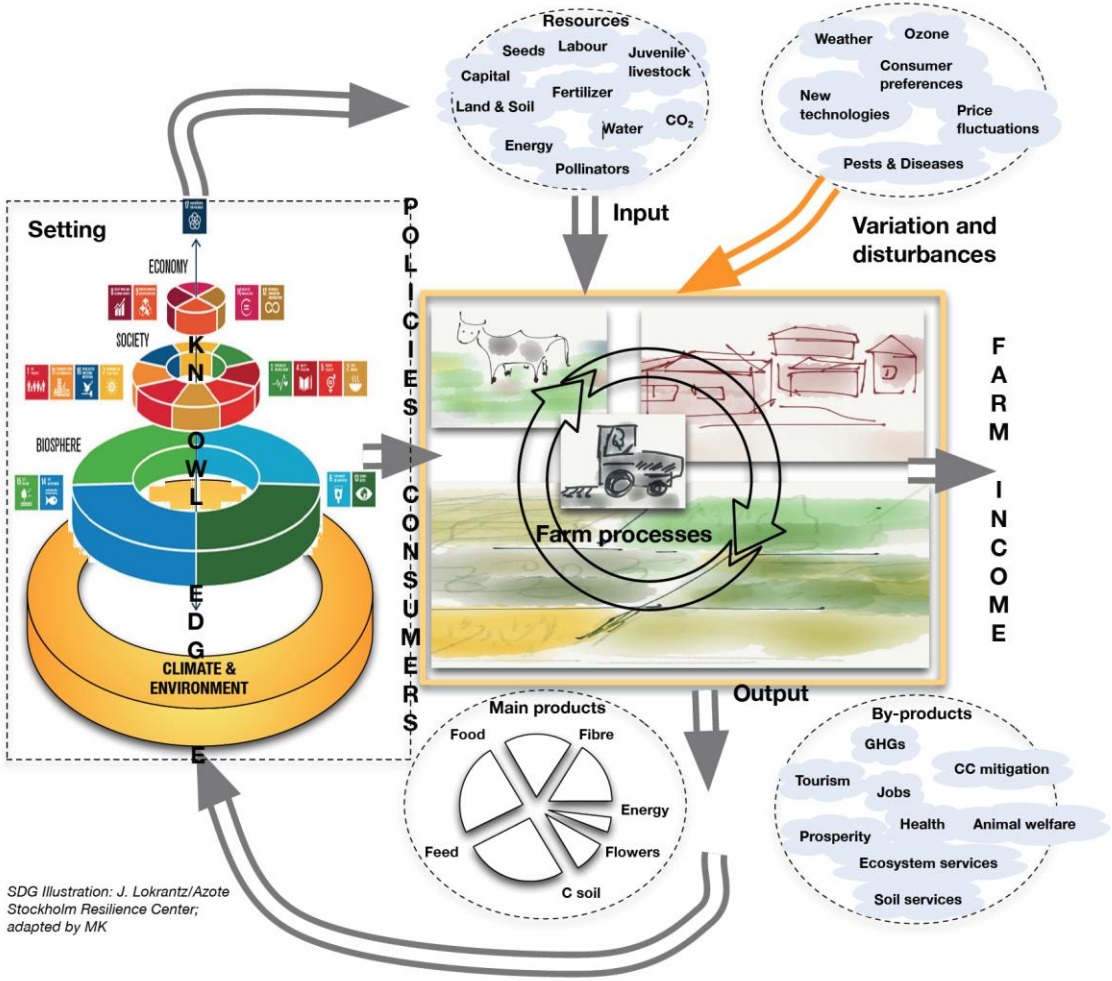

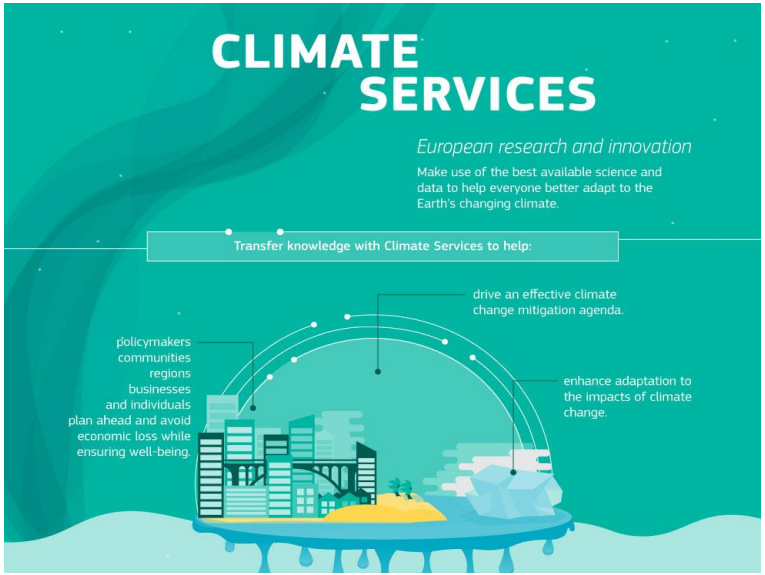
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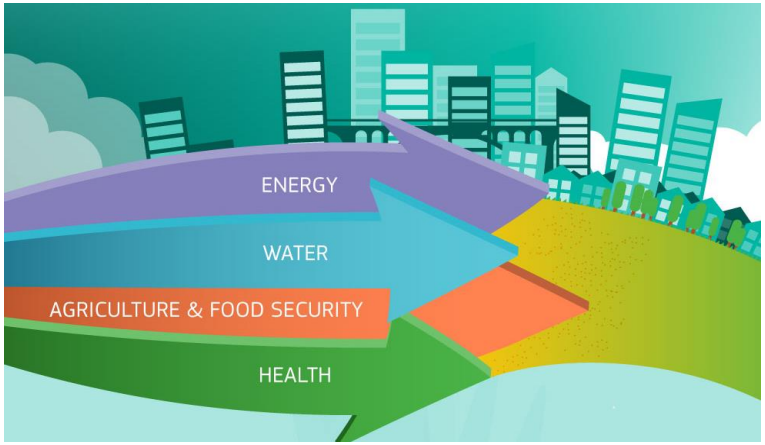
Transfer knowledge with Climate Services to help:
drive an effective climate change mitigation agenda.
policymakers
communities
regions
businesses
and individuals
plan ahead and avoid economic loss while ensuring well-being.
enhance adaptation to the impacts of climate change.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Climate Change Service


JPI Climate
ERA4CS
European Research Area for Climate Services


A European research and innovation
Roadmap
for Climate Services


GFCS
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CLIMATE SERVICES


MED-GOLD

- The **institutional set-up** is crucial. Institutions are not only formal bodies, but they are also playing a substantial role in the climate change adaptation process;

- Awareness of threats to **climate change should be increased** among stakeholders, e.g. the **causal link** between negative effects and climate change can be identified and shown [**extreme events included**, mainly: heat waves and drought];

- **Interdependencies awareness** among stakeholders must be increased. There is a need of a larger **informal space for an easier debate**, to learn, to integrate scientific innovation and traditional knowledge by improving "the interfaces conductivity”;
- There is a stronger need of **public-private partnerships** to deal with complex issues such as those related to water governance;
- There is a (strong) need of changing **scientific research methods** to support non-litigious mediation of environmental conflicts and fostering process co-evolution.

Get Connected

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Thank you!

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