

SUPPORTING EUROPE'S
PARLIAMENTARIANS



COMBATING
CLIMATE CHANGE
MAINTAINING
MOMENTUM

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THE URGENCY OF CLIMATE ACTION

'Unmitigated climate change is threatening the livelihood, the water resources, and the food security of hundreds of millions of people.'

Prof. Jean-Pascal van Ypersele, IPCC

Climate change represents a global threat akin to no other. Unchecked it has the potential to affect all the world's natural systems and citizens. It is not simply a case of temperature rise; climate change represents a change in the energy balances across the globe impacting our weather, water supplies, the quality of our land, the biodiversity we value and the ecosystems that help service our needs. The risks posed to civilisation are substantial.

In the past there have always been safe havens from perceived global threats, but this is unlikely to be the case for climate change. Earth processes are global and inter-connected, even if political solutions are not as yet.

CLIMATE SCIENCE NOT FICTION

Climate change is not a future science fiction; it is already occurring around us. A seminal study by NASA's Goddard Institute, reviewing over 30,000 physical and biological processes, made the clear link between climate change-induced temperature shifts and the altered timing of natural processes, including migratory patterns and pollen release. The research identified that 'significant changes in physical and biological systems are occurring on all continents and in most oceans consistent with warming temperatures'.

In 2007 the Intergovernmental Panel on Climate Change (IPCC) published its Fourth Assessment Report, a comprehensive overview of climate science compiled by thousands of experts. The IPCC's headline message was that 'warming of the climate system is unequivocal'. This research brought home to many that warming is already occurring and the scale of threat this poses.

Since then, science has not stood still. Subsequent studies have indicated that climate change will be more extensive and problematic than the IPCC asserted. For example, studies from 2008 indicate that methane emissions have surged, though the explanation is not yet clear. New gases of concern have been identified, with nitrogen trifluoride (NF₃), used in modern electronics like flat screen TVs, predicted to become an important greenhouse gas (GHG) as use of this equipment expands. Concentrations of NF₃ have risen 20-fold in the atmosphere in the past 30 years.

Predictions regarding the speed and scale of change have also worsened. 2007 and 2008 saw the lowest Arctic sea ice levels since satellite data first became available in 1979. As sea ice melts it reveals water, which is darker than ice, accelerating warming in a positive 'feedback loop'. IPCC predictions that sea ice could vanish between 2040 and 2100 now seem very conservative.

While uncertainties remain over the exact extent and impacts of climate change, worsening predictions reinforce the importance of rapidly seeking a global agreement and implementing emission reduction and adaptation strategies. These will limit the risks we face.

FEEDBACK LOOPS

Driving Urgency

Our environment is inherently interconnected – changing one element will have knock-on impacts and feedbacks will result. Climate feedbacks are a cause for concern, often representing environmental tipping points.

Relatively simple changes like the shift from ice to water or an increase in cloud cover will alter the level of solar radiation absorbed, hence impacting local and global temperatures. 'Feedback loops', however, are often more complex. Carbon sinks are the earth's natural processes that help to buffer atmospheric GHG concentrations. Many terrestrial ecosystems currently serve as carbon sinks; however, the IPCC Fourth Assessment Report identified that this service may change in the future. It suggested that, as a result of warming risks, sequestration will peak – possibly as early as 2030 – and then weaken. Poorly-managed ecosystems may even have the potential to become a source of GHG emissions in the second half of the century.

The loss or limiting of carbon sinks is just one feedback of concern. Other examples include: the melting of permafrost (accelerated by faster than anticipated Arctic ice melt) causing the release of stored methane; and the loss of ecosystem resilience, or their degradation, leading to a reduction in associated services such as food, local and global climate control and water management.

The core EU objective of limiting temperature increase to below 2°C (or even lower), is based on the IPCC's findings. Beyond this the risks of runaway or catastrophic climate change are predicted to jump upwards. This is primarily due to the triggering of feedback loops that we will be unable to counter. In short, we will have pushed our earth's support systems too far. The danger of reaching these irreversible tipping points, once thought a distant risk, is increasingly real.

CLIMATE

The Human Cost

Climate change impacts are seen first within natural systems. Given the close links between human activity and our environment, climate change is anticipated to significantly affect health, security and wealth both in the developed and developing world – and likely most acutely in the latter.

In a typical year, almost 250 million people globally are already affected by climate-related disasters such as droughts and floods. It has been predicted that due to climate change and broader environmental mismanagement, this figure will increase by over 50% to around 375 million by 2015. This scenario would completely overwhelm existing humanitarian efforts.

Poverty

For many 'it is their vulnerability – who they are, where they live, and how they make a living – and not the threats they face per se that will determine whether they survive'. Vulnerability to a threat is often determined by poverty, which reduces an individual or community's ability to respond to adversity. In rich countries, on average 23 people die in a disaster; meanwhile in the least-developed countries the figure is 1,052.

Oxfam has identified four global trends anticipated to increase the vulnerability of the world's poor. Climate change is a key driver for two elements: increased pressure on rural land and increased environmental degradation driving people from their homes. Some estimates suggest that up to one billion people will be forced to move from their homes by 2050, stripping them of their assets and livelihoods.

Health

Approximately 600,000 deaths occurred worldwide as a result of weather-related natural disasters in the 1990s, with some 95% of deaths in developing countries. The health impacts associated with climate change are diverse and are the direct consequences of emissions, temperature change, flood events and drought. The health benefits associated with a 30% reduction in GHG emissions by the EU have been estimated at €20-76bn.

'Continuing climate change will affect some of the most fundamental determinants of health: food, air and water. Areas with weak health infrastructure – mostly in developing countries – will be the least able to cope.'

WHO Director-General Dr Margaret Chan

Conflict

Resource scarcity and environmental degradation are increasingly understood to play an important role in generating or exacerbating conflicts within and between countries. One estimate identifies 46 countries as facing a 'high risk of violent conflict' when climate change is added to traditional security threats. Conflict may arise over access to renewable natural resources, as a consequence of depletion, increased demand or unequal distribution. Conflicts have already erupted over water diversion, dam construction, irrigation, land degradation and desertification.

Conflicts are rarely caused by one single factor, and climate-induced change will not be the lone trigger. It will however augment existing disparities and rivalries. Energy, water availability, food security and infectious disease have been highlighted as important to the environment-security-conflict nexus.

CLIMATE CHANGE AND HEALTH – KEY CONSEQUENCES

| Environmental Change | Environmental Consequence(s) | Health Impact(s) |
|--|--|--|
| Rising sea levels and extreme flooding events. | <p>Increase in coastal flood risk and population displacement.</p> <p>'More than half of the world's population lives within 60km of shorelines. The most vulnerable include the Nile and Ganges-Brahmaputra deltas and small island nations'.</p> | <p>Direct Injury and death due to floods.</p> <p>Indirect Increased risk of infection from water- and vector-borne diseases.</p> <p>Increased tension and risk of conflict due to population displacement.</p> |
| More variable rainfall. | <p>Compromised fresh water supply</p> <p>'Water scarcity already affects 4 in 10 people globally'.</p> | <p>Lack of water and poor water quality compromise hygiene and health.</p> <p>Increase in diarrhoea, which already kills 1.8 million per year.</p> |
| Temperature increase, more extreme summer conditions and less extreme winter cold. | <p>Increase in the range of vectors for disease.</p> | <p>Expanded range for key vectors of disease such as mosquitoes.</p> <p>Increase in climate-sensitive diseases such as malaria, which are among the largest global killers.</p> |
| Less predictable rainfall and river flows, drought. | <p>Reduced crop yields.</p> <p>Crop failure.</p> | <p>Malnutrition leading to increased vulnerability to disease and reduced life expectancy.</p> <p>Famine. In the absence of mitigation or adaptation, climate change is projected to double the population at risk of hunger in Mali by the 2050s.</p> |

Based on the World Health Organisation's 10 key climate and health facts.

EUROPE'S CHANGING CLIMATE

The Consequences

Europe is warming more rapidly than the global average (1.0 versus 1.2°C) and this looks set to continue – with no abatement to GHG emissions an increase of 1 -5.5°C is anticipated in Europe by 2100.

Approximately 90% of all natural disasters that occurred in Europe since 1980 are directly or indirectly attributable to weather and climate. This accounts for around 95% of the economic losses caused by catastrophic events.

We have already seen more frequent hot extremes and fewer cold extremes in the past 50 years, meaning more heatwaves (which in 2003 led to approximately 70,000 additional deaths in 12 Member States), less snow and melting glaciers (impacting river flow and tourism).

Rainfall patterns across Europe are diverging with an increasingly wet northern region (an increase of 10-40% in the 20th century) and a substantially drier south (a decrease of up to 20%). This is a major concern for the water-stressed Mediterranean region in particular.

Extremes of precipitation are predicted to increase across the EU. Heavier rainfall will increase flood risk (losses due to the 2002 floods in central Europe were estimated at €17.4bn), and drought events coupled with less predictable river flows and soil moisture content will decrease certainty for farmers and increase the risk of forest fires.

There has been a northwards movement of marine species (by up to 1,100km in the past 40 years, accelerated since 2000). Coupled with earlier seasonal cycles altering marine ecosystems, this has caused a decline in seabird populations and increased vulnerability of North Sea cod stocks to overfishing.

Life cycles of many animal groups have moved earlier in the season, for example frog spawning, bird nesting, and the arrival of migratory birds and butterflies. As a consequence populations could explode due to lack of early predation, or crash due to breeding no longer being synchronised with the availability of food sources.

Human disease profiles are anticipated to change, with vector-borne diseases expected to increase as tiger mosquitoes, ticks and sandflies move into higher altitudes and latitudes.

Synopsis of EEA reports – Impacts of Europe's changing climate, an indicator-based assessment, 2004 and 2008.

CASCADE OF RISK ASSOCIATED WITH CLIMATE CHANGE:

- Ice melt, ocean warming and acidification;
 - Changes in rainfall – increased drought, flooding and heatwave events;
 - Increase in temperature leading to heatwaves, a decline in snowfall and glaciers;
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- Degradation of land;
 - Loss of biodiversity and shift in biodiversity patterns;
 - More limited or less predictable water resources;
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- Less certain food supplies;
 - Increased population displacement and migration;
 - Increased conflict in response to resource constraints and population displacement;
 - Increased poverty and inequity with the most vulnerable affected more severely;
 - Increased disease;
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- Shrinking national and global economies;
 - Geo-political uncertainty.
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INSTITUTE FOR EUROPEAN ENVIRONMENTAL POLICY

IEEP is an independent not for profit institute dedicated to advancing an environmentally sustainable Europe.

IEEP's diverse research team are expert in climate policy, focusing both on mitigation and adaptation challenges. Since 2003 IEEP has worked for the European Parliament offering independent support to MEPs sitting on the ENVI Committee. In addition IEEP conducts independent research into Europe's efforts to promote climate action, helping to define future policy and best practice approaches to implementation.

Visit www.ieep.eu/briefingsonclimate for:

- Briefing materials translated into Bulgarian, Czech, French, German, Hungarian, Italian, Polish, Romanian and Spanish.
- A full bibliography, lists of the key organisations engaged in the development of EU climate policy and further analysis including a timetable for EU and international action on climate between 2009 and 2014.

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