

Special Report on Climate Change and Land

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Keynote at the Conference for the 33rd Anniversary of KEEI

30 August 2019, Seoul Korea

The IPCC decided at its 43rd session in Nairobi, Kenya (11-13 April 2016) to prepare this special report after member states and observer organizations were asked to submit views on potential themes for Special Reports during the current Sixth Assessment Report cycle. Nine clusters were considered on different themes, including land, cities, and oceans. The Special Report on *Climate Change and Land* represents the second largest cluster and covers 7 proposals from member states and observer organizations that related to land.

Over two years in the making, the Special Report on *Climate Change and Land* explores how the way we use our land contributes to climate change and how climate change affects our land.

This Special Report was prepared by 107 leading scientists from 52 countries across all regions of the world, who acted as Coordinating Lead Authors, Lead Authors and Review Editors. 40% of Coordinating Lead Authors are female.

53% of the authors are from developing countries, making this the first IPCC report to have more authors from developing countries than from developed countries.

Over 7,000 scientific publications were assessed in this report. The report received a total of 28,275 comments from expert reviewers and governments.

Population growth and changes in consumption of food, feed, fibre, timber and energy have caused unprecedented rates of land and freshwater use.

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Humans affect just under three-quarters of ice-free land. A quarter of this land is degraded.

When land is degraded, it reduces the soil's ability to take up carbon and this exacerbates climate change. In turn, Climate change will exacerbate land degradation in many different ways.

500 million people live in areas that experience desertification.

As the global population increases, so drylands can be more vulnerable.

There are limits to what can be done to restore this land.

These regions are more vulnerable to climate change and extreme weather such as drought, floods, and dust storms.

The way we produce food and what we eat is putting increasing pressure on ecosystems and biodiversity.

Climate Change

The temperature over land surface has already increased at almost twice the global average.

Extreme events have become more frequent and/or intense.

Challenging situation

As soils have eroded, land has become degraded.

Land degradation affects productivity, crops, and releases carbon into the atmosphere.

Undermining food security

Despite increasing food production, an estimated 821 million people are undernourished.

Climate change will cause yield declines, increased prices, reduced nutrient levels in food and supply chain disruptions.

In some cold regions yields may temporarily benefit from warmer conditions.

Diverse food production systems increase resilience to economic and climatic shocks.

About 22% of human-caused greenhouse gas emissions come from agriculture, deforestation, and destruction of peatlands.

Deforestation and destruction of peatland directly contribute to 10-15% of human-caused carbon emissions.

The food system as a whole, which includes food production and processing, transport, retail, consumption, loss and waste is currently responsible for up to 22-35% of global greenhouse gas emissions.

Increasing productivity and looking at how we use land for food and water has become more urgent if we want to tackle climate change.

Limiting global warming to any temperature (whether 1.5, 2 or 3 degrees) will involve removing CO₂ from the atmosphere.

This will mean using bioenergy with carbon capture and storage or expansion of forests.

25-30% of food produced is lost or wasted.

Reducing this loss or waste can help reduce greenhouse gas emissions and improve food security.

Almost 41% of human-caused methane emissions come from livestock.

Dietary changes can reduce pressure on land and reduce emissions.

Some dietary choices require more land and water and cause more emissions than others.

Diets high in grains, nuts and vegetables have a lower carbon footprint than meat – by a factor of at least 10 and up to 100.

Dietary change presents major opportunities for adapting to and limiting climate change.

Different cultures and situations are important considerations.

Vegetation and soils absorb one third of CO₂ emissions from fossil fuels and industry.

Sustainable land management can improve the amount of emissions that soils and vegetation absorb and sometimes reverse the adverse impacts of climate change.

Diverse agricultural systems reduce both the economic and environmental risks related to land degradation.

There are ways to prevent vulnerabilities that come from the negative impacts that climate can have on our land and food.

We are best placed to tackle climate change in a world with an overall focus on sustainability.

This means reduced inequalities, improved nutrition and lower food waste.

Early action to reduce emissions means less land needed for bioenergy or for afforestation.

Policies outside of land and energy can make a critical difference, for example population and consumption growth.

If the burden on land increases, keeping warming to 1.5°C will be beyond reach.

There are things we are already doing, that can be scaled up or used elsewhere.

The food system has the potential to adapt to climate change and avoid additional risks by diversifying.

Policies that are outside the land and energy domains can make a critical difference.

There are ways to manage and share risk.

Early action is more cost effective.

Climate change creates additional stresses on land, exacerbating existing risks to livelihoods and biodiversity.

Near-term actions to promote sustainable land management will help reduce the loss of biodiversity.

Indigenous and local knowledge, can contribute to overcoming the combined challenges of climate change, biodiversity loss, food security, desertification, and land degradation.

Drivers on land-use decisions come from both regional and international pressures.

Regional cooperation is vital.

Trade in food can be an important way to relieve local risks to food security from climate change impact.

Some regions, countries and communities have limited capacity to deal with negative effects of climate change.

The right mix of policies makes all the difference.

Reducing greenhouse gas emissions from all sectors is essential if we want to keep below 2°C.

There are limits to the scale of energy crops and afforestation that could be used.

For trees and soils to be effective carbon stores takes time.

Better land management can release agricultural land for afforestation and bioenergy so as to not impact on food security.

Careful management of bioenergy will avoid risks to food security, biodiversity and land degradation.

The three key messages to come out of this report are that:

Land is under growing human pressure

Land is a part of the solution

But land can't do it all.