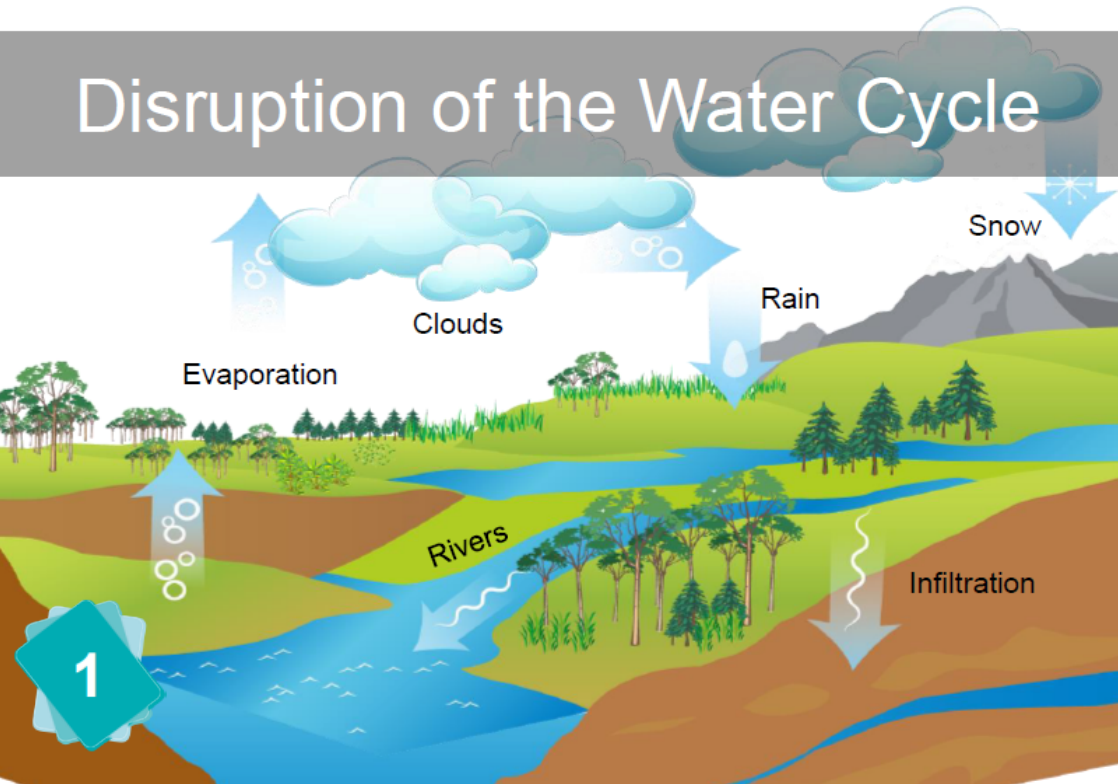


Disruption of the Water Cycle





Hotter oceans and a hotter atmosphere lead to stronger evaporation, causing rainclouds and rainfall. Hotter land and a hotter atmosphere also lead to stronger evaporation, this time causing the ground to dry out.

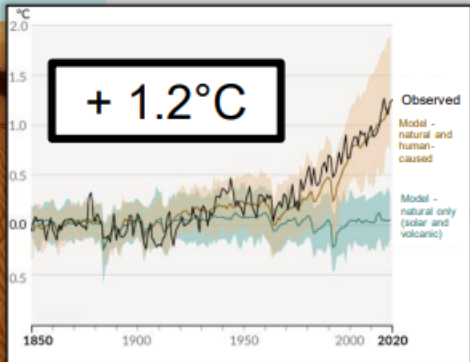
Deforestation



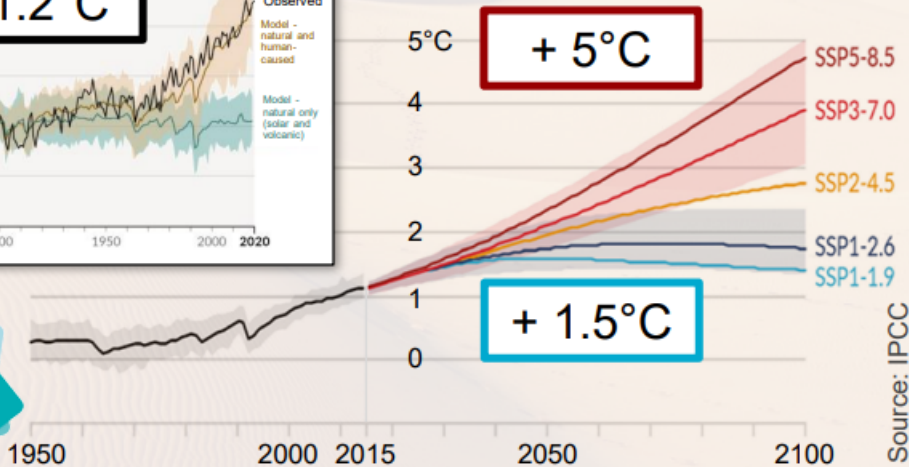
2

Deforestation is defined as cutting down or burning trees beyond the ability of the forest to restore itself. 80% of deforestation is driven by agricultural expansion.

Rising Air Temperatures



Global surface temperature change from 1850-1900



Source: IPCC

The average air temperature at the surface of the Earth has increased by 1.2°C since 1900. Future emission scenarios predict that this increase will reach between 2 and 5°C by 2100.

During the last ice age 20,000 years ago, the average air temperature was only 5°C lower than today and warming up took 10,000 years.

Agriculture



4



Agriculture does not emit much CO₂ but does emit large quantities of methane (from cattle and rice paddies) and nitrous oxide (from fertilizers).

In all, agriculture accounts for 25% of GHGs if we include the induced deforestation.

Freshwater Resources



5



Freshwater resources are affected by changes in rainfall and by the melting of glaciers that regulate the flow of rivers.

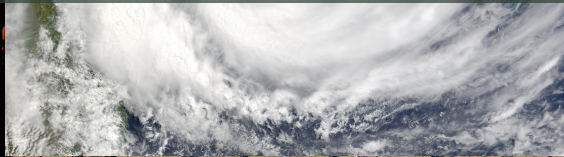
Terrestrial Biodiversity



6

Animals and plants are affected by the changes in temperature and the disruption of the water cycle. They may migrate or go extinct. Some may thrive and proliferate.

Climate threats





Climate change implies the increase of climate threats for agriculture.

Heat waves, forest fires, sea level rise, river floods, cyclones, droughts and marine submersions cannot be prevented and have harsh consequences on cultures.

Forest Fires



8

Forest fires start and spread more easily during droughts and heatwaves.

Marine Submersion

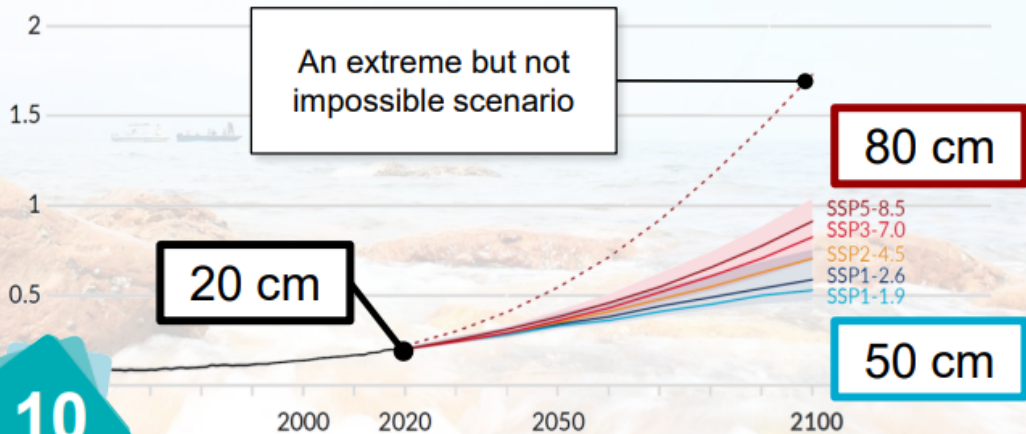
An aerial photograph showing a residential neighborhood completely inundated with dark water. The houses are densely packed, and their roofs are the only parts visible above the water level. A prominent white cylindrical structure, likely a water tower, stands in the lower-left quadrant. In the background, a large body of water and a distant bridge are visible under a clear sky. A teal square with a white number '9' is overlaid in the bottom-left corner.

9

Cyclones and other extreme weather events bring strong winds, waves and low pressure conditions. A 1-hPa (hectopascal) drop in atmospheric pressure causes a 1-cm sea level rise. Therefore cyclones can cause marine submersions (coastal flooding), on top of the sea level rise already caused by global warming.

Rising Sea Levels

Global mean sea level rise from 1900



SSP5-8.5
SSP3-7.0
SSP2-4.5
SSP1-2.6
SSP1-1.9

Source: IPCC

10

Since 1900, sea levels have risen by 20 cm. This is caused by the thermal expansion of ocean waters and the melting of glaciers and ice sheets.

River Flooding



11

The disruption of the water cycle can both increase and decrease rainfall. More rain can lead to river flooding. If the soil is very dry, it makes matters worse because the water runs off it.

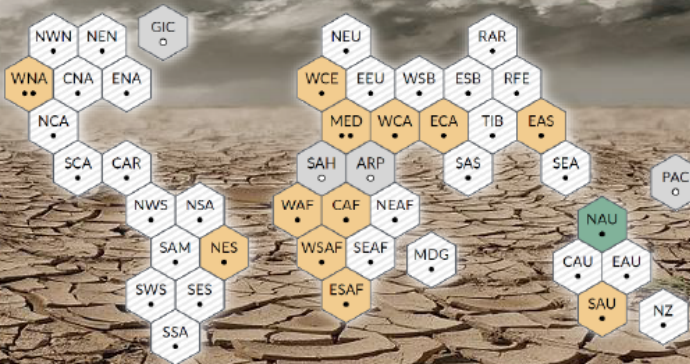
Cyclones

A satellite image of a cyclone, showing a central eye surrounded by a dense ring of clouds, with spiral bands extending outwards. The image is taken from space, showing the curvature of the Earth and the dark blue of the ocean.

12

Cyclones draw their energy from warm water at the surface of the ocean. They are getting stronger because of global warming.

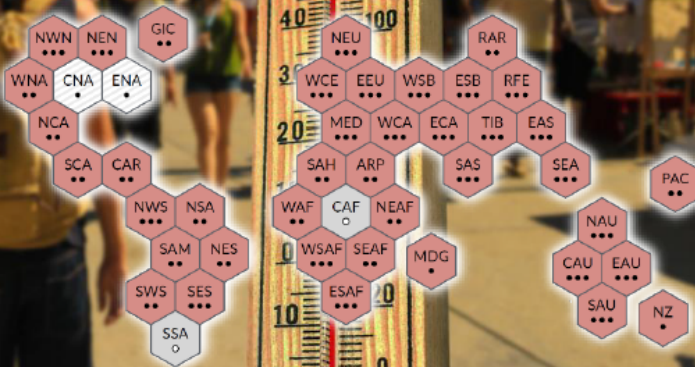
Droughts



13

The disruption of the water cycle can both increase and decrease rainfall. A lack of rain can cause drought. Droughts are likely to become more frequent in the future.

Heatwaves



One consequence of higher temperatures is more frequent heatwaves.

Pesticides





The use of pesticides aims to increase agricultural yields. However, it have some drawbacks : it kills some useful living-beings such as bees, can cause diseases for human, and contribute to decrease soil fertility.

Pest proliferation





The lack of biodiversity allows the proliferation of pest. Those invasive species benefit the lack of predators and multiply quickly. Monoculture makes it easier for pest to proliferate, that is why modern agriculture use chemicals.

Monoculture



17



Monoculture is an ally to deal with the food high demand. However, because we only cultivate one planting variety it is easy for disease and pest to propagate. The over-exploitation of land weakens and erodes the ground provoking land deterioration.


Soil deterioration



18


Intensive, long and inadequate monoculture tends to enpoverish the quality of soils and decrease the biomass. It can decrease importantly the fertility of soil.

Decline in Agricultural Yields

A close-up photograph of a person's hands holding a wheat stalk and loose grains. The hands are positioned in the center, with the left hand holding a single wheat stalk and the right hand holding a small pile of loose grains. The background is a blurred field of golden wheat stalks, suggesting a harvest scene. The lighting is warm and natural, highlighting the texture of the hands and the golden color of the wheat.

Food production can be affected by temperature, droughts, extreme weather events, floods and marine submersion (e.g. the Nile Delta).

Hunger

A group of children, some in school uniforms, are lined up outdoors. They are holding white plates and bowls, waiting for food. In the background, a large black pot sits on a wooden stand, filled with a yellowish, porridge-like substance. The setting appears to be a rural area with a dirt ground and some wooden structures.

20



Hunger can be caused by lower agricultural yields and by the loss of marine biodiversity.

Human Health



21

Hunger, new vectors of disease, heatwaves and armed conflicts can have a negative effect on human health.