

Notes on One of the Four Main Climate Change Impacts

Climate Change Impact: _____

What Causes This Impact?

How Is This Impact Likely To Change In This Century?

How Does This Impact Affect Ecosystems?

How Does This Impact Affect Human Systems?

Climate Change Impact: Higher Air and Ocean Temperatures

What Causes This Impact?

Carbon dioxide in the atmosphere makes it harder for heat energy to leave the Earth system. The extra trapped heat energy is absorbed by the ocean, the land, and the atmosphere. As a result, the ocean and air become warmer. A few places may be getting cooler, but most places on our planet have been getting warmer. This general increase in air and ocean temperatures around the planet is called global warming.

How Is This Impact Likely To Change In This Century?

If there are no major reductions in the emissions of carbon dioxide, global temperatures will increase even more during this century. By the end of this century, the average global temperature could increase four times as much as it already has. This increase in temperature would cause huge damage to ecosystems and human systems.

How Does This Impact Affect Ecosystems?

Tropical plants and animals do not experience large temperature changes and are generally adapted to a narrow range of temperatures. As a result, tropical ecosystems can be very sensitive to and significantly damaged by higher air and ocean temperatures. This damage can harm Cultural Values & Traditions, Food & Resources, and Income from Fishing & Tourism.

How Does This Impact Affect Human Systems?

Higher air and ocean temperatures can primarily harm Food. Higher air temperatures can reduce the amount of food from agroforests, gardens, taro patches, and farms. Higher ocean temperatures can reduce the amount of food from fishing, and can cause coral reefs to bleach and die.

Climate Change Impact: Changing Rain Patterns

What Causes This Impact?

The extra heat energy within the Earth system changes our planet's water cycle. For example, higher temperatures cause more water to evaporate. These changes affect the precipitation patterns in different parts of our planet.

How Is This Impact Likely To Change In This Century?

The general prediction is that wet places will get wetter and dry places will get drier. In dry seasons, drought is likely to happen more often and to last longer. In wet seasons, storms could generally release more water and cause more flooding. There could also be changes in the number and strength of extreme storms, such as tropical cyclones.

How Does This Impact Affect Ecosystems?

Land plants and animals are adapted to the general local pattern of rainfall. Changes such as more drought or much heavier rainfall can make it harder for these organisms to survive and reproduce. This damage can harm Cultural Values & Traditions, Food & Resources, and Income from Fishing & Tourism.

How Does This Impact Affect Human Systems?

Changing rain patterns can mostly damage Food and Freshwater. Drought or too much rain can reduce the amount of food from agroforests, gardens, taro patches, and farms. Drought can significantly reduce the amount of freshwater available for drinking and home uses. A long drought can become a very dangerous emergency. Extreme storms are also very dangerous, and can damage Homes and Transportation.

Climate Change Impact: Sea Level Rise

What Causes This Impact?

Melting of land ice causes water to flow into the ocean. Most of the land ice is in huge polar ice sheets and there is also melting land ice in mountain glaciers. Also the ocean is getting warmer, and this increase in temperature causes the ocean to expand, meaning that its volume increases. (This phenomenon of warmer things increasing in volume because their molecules move further apart is called thermal expansion.)

How Is This Impact Likely To Change In This Century?

As the air and land gets warmer, more of the land ice will melt. As the ocean absorbs even more heat energy, it will continue to get warmer and increase in volume due to thermal expansion.

How Does This Impact Affect Ecosystems?

Higher sea levels can cause stronger pounding from waves and more flooding during high tides and storm events. Strong waves and floods damage marine and coastal ecosystems. This damage can harm Cultural Values & Traditions, Food & Resources, and Income from Fishing & Tourism. Also in low-lying ground areas (especially on low islands), underground salt water comes closer to the surface and can contaminate groundwater and make it unfit for plants and trees to grow well.

How Does This Impact Affect Human Systems?

Higher sea levels can damage Shelter, Food, Freshwater and Transportation. Strong waves and floods can damage homes, fishing and food-growing areas, water sources both above and below ground, and coastal roads and airports.

Climate Change Impact: Ocean Acidification

What Causes This Impact?

Because there is more CO₂ in the atmosphere, more CO₂ dissolves in the ocean. The dissolved CO₂ forms a weak acid called carbonic acid, and changes the ocean's acid-base balance. The extra CO₂ has already caused about a 25% increase in ocean acidity.

How Is This Impact Likely To Change In This Century?

If we do not significantly change our present pattern of burning fossil fuels, scientists project that the ocean acidity could double (100% increase) before the year 2100.

How Does This Impact Affect Ecosystems?

Increased ocean acidity makes it much harder for marine organisms to build hard body parts, such as shells that are made of calcium carbonate. Organisms that are harmed include corals that build reefs and plankton that are the producers in many ocean food webs. This damage can harm Cultural Values & Traditions, Food & Resources, and Income from Fishing & Tourism.

How Does This Impact Affect Human Systems?

Increased ocean acidity can mostly damage Food. Increased ocean acidity makes it much harder for marine organisms to build hard body parts, such as shells that are made of calcium carbonate. Ocean acidification can significantly reduce the amount of food from ocean food webs.