



## Backgrounder:

### Regional impacts + the 1.5°C climate target

### United States, Canada + Latin America

---

#### United States

Based on the Trump Administration's intent to withdraw from the Paris Agreement, Climate Action Tracker [rates](#) the US's policy response to climate change as "critically insufficient", and consistent with more than 4°C of global warming.

- The US has ratified the Paris Agreement, and pledged to reduce domestic emissions by 26%-28% below 2005 levels by 2025. However, the Trump Administration has indicated that it intends to withdraw from the Paris Agreement and stop implementation of the NDC. It legally remains in place until 4 November 2019.
- Under the Obama Administration's mid-century strategy, the US has a long term goal to reduce emissions 68-76% below 2005 levels by 2050.

#### Projected impacts across the United States

##### With more than 1.5°C of global warming:

- Subtropical parts of the US are likely to experience a temperature rise of more than 6°C during the summer months, with 4°C global temperature rise.<sup>1</sup>
- Economic damages resulting from climate change could cost about [1.2% of the country's GDP](#) for every additional degree on average under a [high emissions scenario](#) (RCP8.5) where temperatures rise 4.0-6.1°C by the end of the century.

#### Canada

Canada's NDC is [rated](#) by Climate Action Tracker as "highly insufficient" - well below what is needed to reach the 1.5°C temperature target contained in the Paris Agreement. Current Canadian climate pledges are consistent with the world warming by 3°C - 4°C.

- Canada has ratified the Paris Agreement, and pledged to reduce emissions 30% below 2005 levels by 2030. With current policies, Canada will miss this target.
- Canada' NDC target emissions by 2030: 504-646 MtCO<sub>2</sub>e (depending on whether land use is included). Canadian emissions in 2030 under current policies: 636-775 MtCO<sub>2</sub>e.

---

<sup>1</sup> Turn down the heat: why a 4°C warmer world must Be avoided (2012), The World Bank, p.38.

## Projected impacts across North America

### With 1.5°C of global warming:

- Rising temperatures, drought, and unstable weather patterns have serious implications for global food production. Every degree of global temperature rise [reduces](#) global yields of wheat by 6.0%, rice by 3.2%, maize by 7.4%, and soybean by 3.1%.

### With more than 1.5°C of global warming:

- Globally, agricultural yields [fall rapidly](#) between one and 3°C of warming. Once local temperatures reach 3°C above pre-industrial levels, all crops are negatively affected, wherever they are in the world - including in temperate regions.<sup>2</sup> Fish species go locally extinct, with serious impacts on fisheries.<sup>3</sup>
- Under a [high emissions scenario](#) (RCP8.5) where temperatures rise 4°C - 6.1°C by the end of the century, [summer cyclones](#) could drop by over 40% by 2100. This would reduce cloudiness and accentuate maximum temperatures.

## Projected impacts across the US and South America

### With 1.5°C of global warming:

- Rising temperatures, drought, and unstable weather patterns have serious implications for global food production. Every degree of global temperature rise [reduces](#) global yields of wheat by 6.0%, rice by 3.2%, maize by 7.4%, and soybean by 3.1%.

### With more than 1.5°C of global warming:

- Globally, agricultural yields [fall rapidly](#) between one and 3°C of warming. Once local temperatures reach 3°C above pre-industrial levels, all crops are negatively affected, wherever they are in the world - including in temperate regions.<sup>4</sup> Fish species go locally extinct, with serious impacts on fisheries.<sup>5</sup>
- Under a 2°C temperature rise, mean annual precipitation is projected to decrease by about 30% in the Mississippi and Amazon river basins.<sup>6</sup>
- Under a [high emissions scenario](#) (RCP8.5) where temperatures rise four to 6°C by the end of the century, the Southwest and Central Plains have a high likelihood (80%) of experiencing [decade-long mega-droughts](#) between the middle and end of the century.

---

<sup>2</sup> IPCC, AR5, WGII, Chapter 7, p.497.

<sup>3</sup> IPCC, AR5, WGII, Chapter 7, p.508.

<sup>4</sup> IPCC, AR5, WGII, Chapter 7, p.497.

<sup>5</sup> IPCC, AR5, WGII, Chapter 7, p.508.

<sup>6</sup> Turn down the heat: why a 4°C warmer world must be avoided (2012), The World Bank, p.xvi.

## Argentina

Argentina's NDC is [rated](#) by Climate Action Tracker as "highly insufficient" - well below what is needed to reach the 1.5°C temperature target contained in the Paris Agreement. Current Argentinian climate pledges are consistent with the world warming by 3-4°C.

- Argentina has ratified the Paris Agreement, and pledged to reduce domestic emissions by 22% above 2010 levels (unconditional target), and by 7% below 2010 levels (conditional target).

## Brazil

Brazil's NDC is [rated](#) by Climate Action Tracker as "insufficient" to reach the 1.5°C temperature target contained in the Paris Agreement. Current Brazilian climate pledges are consistent with the world warming by up to 3°C.

- Brazil has ratified the Paris Agreement, and pledged to reduce domestic emissions by 37% by 2025 and 43% by 2030 below 2005 levels.
- Brazil has a long term goal to shift towards energy systems based on renewable sources and decarbonisation of the global economy by the end of the century.

## Projected impacts across South America

**With 1.5°C of global warming:**

- The amount of freshwater available in rivers and lakes in North-east Brazil could [drop by 7%](#).
- Rising temperatures, drought, and unstable weather patterns have serious implications for global food production. Every degree of global temperature rise [reduces](#) global yields of wheat by 6.0%, rice by 3.2%, maize by 7.4%, and soybean by 3.1%.

**With more than 1.5°C of global warming:**

- Globally, agricultural yields [fall rapidly](#) between one and 3°C of warming. Once local temperatures reach 3°C above pre-industrial levels, all crops are negatively affected, wherever they are in the world - including in temperate regions.<sup>7</sup> Fish species go locally extinct, with serious impacts on fisheries.<sup>8</sup>
- As temperatures rise protected areas start to disappear. In two degrees celsius temperature rise, [25% of the 80,000 plant and animal species](#) in the world's most naturally rich areas, such as the Amazon and the Galapagos, could face [local extinction](#) by the end of the century. Warming temperatures may affect the behaviour of insects and animals, causing a [cascade](#) effect that affects entire ecosystems.

---

<sup>7</sup> IPCC, AR5, WGII, Chapter 7, p.497.

<sup>8</sup> IPCC, AR5, WGII, Chapter 7, p.508.

- There are a number of potential '[tipping points](#)' at which abrupt change may occur. The Arctic could become ice-free even in winter, the Amazon rainforest could die off, or the Tibetan Plateau could see the total disappearance of snow and ice cover. It is extremely difficult to know if and when such sudden events will occur - so scientists can only assess changing levels of risk. But in a recent study, half of the potential tipping points identified could be [triggered](#) by a global temperature rise of [2°C or less](#).
- Under a [high emissions scenario](#) (RCP8.5) where temperatures rise 4.0-6.1°C by the end of the century, and moderate development, South America could see about 9.1 million climate migrants by the middle of the century. This is about 1.9% of the population.<sup>9</sup>
- A 3°C temperature rise increases the [possibility](#) that fragile natural systems like the Arctic or Amazon experience "abrupt and irreversible changes" by melting entirely, or drying out, for example. The risks of these 'tipping points' are moderate from 0 to one degree celsius temperature rise, but "increase disproportionately" as temperature increases from one to 2°C, becoming "[high](#)" [above 3°C](#)<sup>10</sup>, according to the IPCC. The [inclusion](#) of these risks in to an economic model raises the social cost of carbon from \$15/tCO<sub>2</sub> to \$116/tCO<sub>2</sub>.
- With 3.5°C of temperature rise, the rate of malaria in the region is expected to increase by 50%, compared to pre-industrial levels.<sup>11</sup>

## Projected impacts across Central America

### With 1.5°C of global warming:

- Under a [low emissions scenario](#) (RCP2.6) where temperatures rise 1.3°C - 1.9°C by the end of the century, Mexico and Central America could see 1.4 million climate migrants by the middle of the century.<sup>12</sup>
- Rising temperatures, drought, and unstable weather patterns have serious implications for global food production. Every degree of global temperature rise [reduces](#) global yields of wheat by 6.0%, rice by 3.2%, maize by 7.4%, and soybean by 3.1%.
- By the end of the century, [nine out of ten](#) of coral reefs are at risk from severe degradation from 2050 onwards. This declines to 70% by 2100 - meaning that some coral reefs have a chance of survival. At the moment, coral reefs [provide](#) about US\$30 billion annually to the world economy, in coastal protection, building materials, fisheries and tourism.

### With more than 1.5°C of global warming:

- Globally, agricultural yields [fall rapidly](#) between one and 3°C of warming. Once local temperatures reach 3°C above pre-industrial levels, all crops are negatively affected,

<sup>9</sup> Groundswell: Preparing for Internal Climate Migration, (2018), World Bank Group, p.109.

<sup>10</sup> IPCC, AR5, WGII, SPM, p.12.

<sup>11</sup> Turn down the heat: why a 4°C warmer world must Be avoided (2012), The World Bank, p.56.

<sup>12</sup> Groundswell: Preparing for Internal Climate Migration, (2018), World Bank Group, p.163.

wherever they are in the world - including in temperate regions.<sup>13</sup> Fish species go locally extinct, with serious impacts on fisheries.<sup>14</sup>

- Agriculture in tropical parts of Central America is likely to be particularly [hard hit](#). Wheat yields [could fall by 25%](#) in some places if temperatures rise by 1.5°C. However, limiting temperature rise to 1.5°C instead of 2°C will mean [less serious implications](#) for food security in many poorer countries.
- If temperatures rise to 2°C, [virtually all](#) the world's tropical coral reefs are at risk of severe degradation and [collapse](#). Coral reefs account for [10 to 12%](#) of the fish caught in tropical countries, and 20 to 25% of the fish caught by developing nations.<sup>15</sup> They provide food, income and protection from storms for millions of people along [coastal areas](#).
- In Nicaragua, the percentage of days with high heat stress could [increase 5%](#) by the middle of the century under 3°C of warming.
- Under 3°C of warming, [tropical rainforests could decline by more than 50%](#). A large proportion of these would be replaced by savanna and grassland.
- Under a [high emissions scenario](#) (RCP8.5) where temperatures rise 4.0-6.1°C by the end of the century, Mexico could see about 1.2 million internal climate migrants by the middle of the century.<sup>16</sup>

## Projected impacts across Latin America

- **With 1.5°C of global warming:**  
Under a [low emissions scenario](#) (RCP2.6) where temperatures rise 1.3°C - 1.9°C by the end of the century, Latin America could see about 5.8 million internal climate migrants by 2050.<sup>17</sup>
- Rising temperatures, drought, and unstable weather patterns have serious implications for global food production. Every degree of global temperature rise [reduces](#) global yields of wheat by 6.0%, rice by 3.2%, maize by 7.4%, and soybean by 3.1%.

### With more than 1.5°C of global warming:

- Globally, agricultural yields [fall rapidly](#) between one and 3°C of warming. Once local temperatures reach 3°C above pre-industrial levels, all crops are negatively affected,

---

<sup>13</sup> IPCC, AR5, WGII, Chapter 7, p.497.

<sup>14</sup> IPCC, AR5, WGII, Chapter 7, p.508.

<sup>15</sup> IPCC, AR5, WGII, CC Boxes, p.99.

<sup>16</sup> Groundswell: Preparing for Internal Climate Migration, (2018), World Bank Group, p.163.

<sup>17</sup> Groundswell: Preparing for Internal Climate Migration, (2018), World Bank Group, p.111.

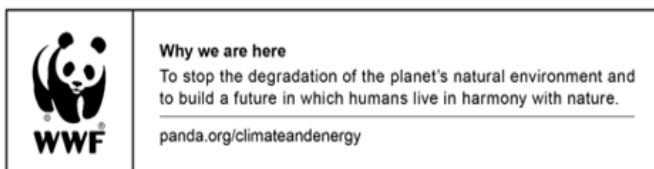
wherever they are in the world - including in temperate regions.<sup>18</sup> Fish species go locally extinct, with serious impacts on fisheries.<sup>19</sup>

- Under a [high emissions scenario](#) (RCP8.5) where temperatures rise 4.0-6.1°C by the end of the century, and moderate development, Latin America could see about 10.5 million climate migrants by 2050.<sup>20</sup>

**Benefits of limiting temperatures to 1.5°C of global warming:**

- About [3.3 million](#) cases of dengue fever annually in Latin America and the Caribbean could be avoided compared with a no-policy scenario with warming of 3.7°C. (An additional [0.5 million per year](#), compared with 2°C.)

*This paper was prepared by GSCC to support understanding of issues arising from the IPCC's Special Report on 1.5°C warming.*



**For further information contact:**

**Dr Stephen Cornelius**  
Chief Advisor-Climate Change, WWF-UK  
[SCornelius@wwf.org.uk](mailto:SCornelius@wwf.org.uk)

**Dr Fernanda Viana De Carvalho**  
Global Policy Manager,  
WWF Climate & Energy Practice  
[fcarvalho@wwfint.org](mailto:fcarvalho@wwfint.org)

**Christopher Weber**  
Global Climate & Energy Lead Scientist,  
WWF Global Science  
[Chris.Weber@wwf.org](mailto:Chris.Weber@wwf.org)

<sup>18</sup> IPCC, AR5, WGII, Chapter 7, p.497.

<sup>19</sup> IPCC, AR5, WGII, Chapter 7, p.508.

<sup>20</sup> Groundswell: Preparing for Internal Climate Migration, (2018), World Bank Group, p.111.