The Truth About Climate Change

FEU-US

To Dr. Osvaldo F. Canziani

former Director of the World Meteorological Organization Regional Office for Latin America and the Caribbean and former Co-Chair of the Intergovernmental Panel on Climate Change Working Group II.

A tireless advocate for a better understanding of climate change and for the truth.
With everlasting gratitude for his thoughtful guidance, still present, that inspired this report.

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About FEU-US

The Universal Ecological Fund (Fundación Ecológica Universal FEU-US), a non-profit non-governmental organization, seeks to increase awareness that encourages actions through researching, analyzing, producing and disseminating information. It was established in 2005 as the US office of Fundacion Ecologica Universal (FEU), founded in Buenos Aires, Argentina in 1990.

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Key Numbers

195 countries. 195 countries adopted the Paris Agreement on climate change. It represents a critical step towards global climate action since, except for a handful of countries, climate change has not been a priority for taking action for almost 20 years.

162 pledges. 162 pledges, representing 189 countries, were made to combat and adapt to climate change, to be implemented from 2020 to 2030.

US$100 billion. 83 percent of the pledges are in part or entirely conditional to the US$100 billion per year in financial assistance for their full implementation.

33 percent. If all pledges are implemented, global GHG emissions will be 33 percent above the level of what they should be in 2030 to stay below 2ºC above pre-industrial levels.

1ºC. Global average temperature has already reached 1ºC above pre-industrial times in 2015.

1.5ºC target. Because of the lack of action to stop the increase in global GHG emissions for the last 20 years, an additional warming of 0.4-0.5ºC is expected. The 1.5C could be reached by the early 2030s.

2ºC target. The 2ºC target could be reached by 2050, even if pledges are fully implemented.

Double. Weather-related events due to climate change have doubled in number since 1990. Reaching the 2ºC target means an additional doubling in the number of weather events already experienced everywhere.

Net zero. To stay below 2ºC, CO_2 emissions should be net zero by 2060-2075.

65 percent. CO_2 accounts for 65 percent of global GHG emissions as a result of the burning of fossil fuels.

82 percent. About 82 percent of the energy (electricity, fuel and natural gas) in the world is produced by burning fossil fuels –31 percent oil, 29 percent coal and 22 percent natural gas.

30 percent. Non-fossil fuel electricity generation is 30 percent –16 percent from hydropower, 5 percent from renewables and 11 percent from nuclear power.

50 percent. The oceans, trees and plants remove about half of man-made CO_2 emissions.

Double. Extensive reforestation and conversion of land into forest will not be enough to cut CO_2 emissions to net zero. It would imply expanding the current world's forest cover, at least, twofold.

0.1 percent. To reduce CO_2 emissions to net zero, technologies such as carbon capture and storage will be required. About a dozen CCS plants in operation capture less than 0.1 percent of CO_2 emissions.

Zero. The production of energy by burning biomass coupled with CCS will also be required to remove CO_2 from the atmosphere. Currently, there are no such plants in the world.

40 percent. The demand for energy is estimated to double due to the anticipated 40 percent population increase by 2050. Changing the way energy is produced in the world will be critical. Adaptation to reduce the risks and the unavoidable impacts of climate change will be too.

2018. By 2018, all countries agreed to revise their pledges –sufficient time to significantly raise the ambition of actions to reduce GHG emissions in all countries.

The Truth About Climate Change

"We cannot solve our problems with the same level of thinking that created them."
Albert Einstein

The adoption of the Paris Agreement represents a critical step towards global climate action. In December 2015, all countries agreed for the first time to collectively tackle climate change. Starting in 2020, actions will be implemented in 195 countries to combat and adapt to the changing climate.

Except for a handful of countries, climate change has not been a priority for taking action for almost two decades. Despite robust scientific facts, several excuses have been used to justify why action should be delayed:

- There is overwhelming evidence that the negative impacts of climate change would massively overshadow the positive ones; yet some argue that there are still scientific uncertainties and some of the impacts of climate change could be positive.
- Inaction to combat climate change poses higher risks and costs for people and development; yet some argue that the costs of reducing greenhouse gas (GHG) emissions would be prohibitive.
- Social and economic development cannot be achieved without environmental protection; yet some argue that economic and social development should be prioritized over global environmental protection.
- There is massive evidence that we are already suffering the negative effects of human-induced climate change; yet some argue that action to tackle climate change could be postponed since it would only happen in the long-term.
- Responsibilities should be differentiated among countries since not all countries contributed equally to the problem.

In addition, the way climate change has been communicated to the public has also contributed to delayed action.

For more than 20 years, the Intergovernmental Panel on Climate Change (IPCC), the premier scientific body on climate change, has been analyzing the trends and sources of changes in the climate system, the impacts of changes in climate and the options to combat climate change. Climate science is complex. IPCC scientists use a combination of observations, assumptions and models of possible futures for their assessment. They also assign probabilities of when certain changes may happen, because changes in climate depend on policies and actions taken by countries, not just on science.

The IPCC detailed assessment is published in three voluminous reports. Policymakers primarily use the Synthesis Report and the three Summaries for Policymakers, which summarize the main conclusions of the comprehensive assessment of climate science, as a basis for decision-making.

The public has access to information on climate change through other sources than the IPCC and other scientific reports. Information from these other sources has often been confusing for the

public. In addition, there has also been deliberate misinformation from deniers and sectors with vested interests in maintaining the current situation.

This miscommunication of climate change has created some misunderstandings in the public, which has led many to perceive climate change as abstract, distant and even controversial. As a result, what is actually happening with the climate and the immediate actions required to address climate change have been misunderstood.

The decisions taken at the Paris Climate Conference, if implemented, will affect and benefit all of us. Over the next few years, we will have to produce energy from low-carbon sources, use energy more efficiently, travel less and even change our diets. The climate will still continue to change and we will continue to experience unusual weather everywhere.

Public support will be crucial to accelerate climate action in all countries. Thus, the following questions aim at explaining some misunderstandings about climate change and the Paris Agreement.

1. Was the Paris Conference on climate change successful?

The Paris Conference was indeed successful. Since the 1992 Climate Change Convention, the adoption of the Paris Agreement commits all countries 'to strengthen the global response to the threat of climate change'[1].

The Paris Agreement is a political agreement. It includes important elements never before agreed under the Climate Change Convention: the collective action by all countries to reduce GHG emissions and to adapt to the changing climate. It also includes the commitment by developed countries to jointly mobilize US$100 billion a year by 2020 to assist developing countries reduce GHG emissions and adapt to the changing climate.

Its predecessor, the 1997 Kyoto Protocol and its 2012 amendment, established GHG emission reduction targets for industrialized countries[2]. In contrast, the Paris Agreement establishes a 'pledge and review' system, based on pledges submitted by **all** countries –the Intended Nationally Determined Contributions (INDCs) —to be reviewed every five years. These pledges, however, are not legally binding.

2. What is the Paris Agreement's goal?

The goal of the Paris Agreement is to hold 'the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels'[3]. This is because a 2ºC increase in global average temperature was considered as the upper limit beyond which the risks and negative impacts of the changing climate are expected to increase rapidly[4].

To achieve its goal, the Paris Agreement set a long-term GHG emission reduction target –to achieve a 'balance between anthropogenic (or man-made) emissions by sources and removals by sinks (the oceans, trees and plants) of GHGs in the second half of the century'[5]. This is in line

[1] Paris Agreement, Article 2 (2015)
[2] The 1997 Kyoto Protocol commits developed countries to reduce GHG emissions by at least five per cent below 1990 levels in the period 2008-2012. A second commitment period was agreed by the Protocol's 2012 Doha Amendment, with emission reduction targets of at least 18 per cent below 1990 levels in the period 2013-2020.
[3] Paris Agreement, Article 2 (2015)
[4] United Nations Advisory Group on Greenhouse Gases (1990); IPCC, Fifth Assessment Report (AR5), Synthesis Report (2014)
[5] Paris Agreement, Article 4 (2015)

with the IPCC's most recent analysis, the Fifth Assessment Report (AR5), which concluded that net zero GHG emissions will be required to stay below 2ºC well before 2100[6]. Because significant emission reductions would be required to achieve its goal and long-term target, the Paris Agreement recognizes that a maximum level (or peak) should be reached 'as soon as possible'. However, it acknowledges that 'peaking will take longer for developing countries'[7].

The IPCC concluded that middle income countries, where more than 70 percent of the world population live[8], are currently responsible for 54 percent of global GHG emissions[9]. The top ten largest emitters, in descending order of total emission levels, are China, the United States, the European Union, India, Russia, Indonesia, Brazil, Japan, Canada and Mexico[10]. Of the ten, five – China, India, Indonesia, Brazil and Mexico— are middle income countries. The others are high-income countries, where 18 percent of the world population live[11] and have the highest per capita emissions.

Allowing developing countries to take more time to reduce GHG emissions may seem as a fair outcome of the Paris Agreement for some. However, it may enable some developing countries, currently categorized as middle income countries by the IPCC, to continue delaying climate action.

In addition, international aviation and shipping were not included in the Paris Agreement, thus also allowing these sectors to postpone action to reduce emissions. International travel and trade currently accounts for two percent of global GHG emissions[12].

3. Why has it been so difficult to take climate action?

Only industrialized countries were required to reduce GHG emissions under the Kyoto Protocol. Although some industrialized countries actually met the emission reduction targets set by the Kyoto Protocol, these efforts were offset by increasing emissions by most countries, industrialized and developing.

In addition, political and sectoral interests have contributed to delay collective efforts to address climate change. The changes required to take decisive climate action may have been perceived by many as incompatible with economic development. Some incorrectly believe that economic development and growth can only be achieved in the business-as-usual way –by burning coal, oil and gas. The costs of implementing actions to reduce GHG emissions were considered as prohibitive compared to the costs of continuing to use fossil fuels. Also, pressure from sectors benefiting from the use of fossil fuels has also halted climate action.

As a result, and despite overwhelming scientific evidence, climate action has been delayed and global GHG emissions have continued to steadily increase –from 38 Gigatons of carbon dioxide (CO_2) equivalent ($GtCO_2$-eq: unit to measure all GHGs combined) in 1990 to 49.5 $GtCO_2$-eq in 2010[13]. Currently, annual global GHG emissions are 54 $GtCO_2$-eq[14].

[6] IPCC, AR5, WGI Summary for Policymakers (2013) and Synthesis Report (2014)
[7] Paris Agreement, Article 4 (2015)
[8] World Population Prospects: The 2015 Revision, United Nations Population Division (2015)
[9] IPCC, AR5, WG III, Chapter 1 and Chapter 13 (2014); and Emission Database for Global Atmospheric Research (EDGAR). European Commission, Joint Research Centre/PBL Netherlands Environmental Assessment Agency (2014)
[10] UNEP. The Emissions Gap Report 2015 (2015)
[11] World Population Prospects: The 2015 Revision, United Nations Population Division (2015)
[12] Emission Database for Global Atmospheric Research (EDGAR). European Commission, Joint Research Centre/PBL
[13] IPCC, AR5, Working Group (WG) III, Chapter 1 (2014)
[14] UNEP. The Emissions Gap Report 2014 (2014) and Emission Database for Global Atmospheric Research (EDGAR). European Commission, Joint Research Centre/PBL Netherlands Environmental Assessment Agency

4. Are the current pledges by countries adequate to tackle climate change?

As part of the Paris Agreement, 162 pledges were submitted to the Climate Change Convention describing how each country intends to tackle climate change. These pledges cover 189 countries accounting for about 98 percent of global GHG emissions[15].

Most of the INDCs include pledges on how countries plan to reduce GHG emissions and to adapt to climate change. Because for the first time most developing countries made these types of pledges, 83 percent of them are in part or entirely conditional to the provision of finance, technology and capacity-building, for their full implementation.

Various research groups analyzed the collective impact of the INDCs[16]. These studies used different methodologies and criteria for their assessment[17]. Some studies, for example, include all unconditional and conditional INDCs, while others only include unconditional ones. Different assumptions were also used to harmonize the information included in the pledges submitted by countries, as well as to make projections for the rest of the century, beyond the 2030 timeframe of the INDCs. Thus, the conclusions from these studies on the collective impact of the INDCs vary.

All the studies agreed that the INDCs show a real increase in the commitment by countries to combat climate change. Collectively, pledges by countries to be undertaken between 2020 and 2030 contribute to lowering the global GHG emissions trajectory compared to the current path.

Current pledges, however, are far from sufficient to put the world on a pathway to meet the 2ºC target[18].

To stay below 2ºC, global GHG emissions should be reduced by 22 percent from current levels (of 54 $GtCO_2$-eq) to reach 42 $GtCO_2$-eq in 2030, as concluded by the IPCC and the UNEP Emissions Gap assessment[19]. However, if only unconditional pledges are implemented, global GHG emissions are expected to increase by six percent in 2030, reaching 56 $GtCO_2$-eq (range 54-59). If unconditional and conditional pledges are fully implemented, global GHG emissions will remain at about the current level of 54 $GtCO_2$-eq (range 52-57) [20]. The difference between the projected level of global GHG emissions in 2030 and what they should be to stay below 2ºC, or the emissions gap, is 14 $GtCO_2$-eq (range 12-17)[21], or 33 percent above the 2ºC pathway. This emissions gap is comparable to the annual emissions from the world's energy production, which totaled 17 $GtCO_2$-eq in 2010[22], to supply electricity, fuel and natural gas used by other sectors. As a reference, without the Paris Agreement pledges, global GHG emissions are projected to reach 65 $GtCO_2$-eq (range 60-70) [23] in 2030, or an increase of about 20 percent.

Moreover, the INDCs are legally non-binding pledges made at the international level. Pledges are subject to approval at the national level through policies, regulations and incentives for their implementation in each country. Thus, pledges may be changed, raising or reducing the overall GHG emission reduction targets.

[15] Climate Action Tracker
[16] Studies on INDCs were developed by Climate Action Tracker, Australian-German Climate and Energy College, Climate Interactive, Danish Energy Agency, European Commission Joint Research Centre, the International Energy Agency, London School of Economics, Massachusetts Institute of Technology, MILES Project Consortium, PBL Netherlands Environmental Assessment Agency, among others. The Synthesis Report on the aggregate effect of the INDCs by the Climate Change Convention (FCCC/CP/2015/7) and The Emissions Gap Report 2015 by UNEP summarize the research from these studies.
[17] World Resources Institute (2015): http://www.wri.org/blog/2015/11/insider-why-are-indc-studies-reaching-different-temperature-estimates
[18] UNEP. The Emissions Gap Report 2015 (2015)
[19] IPCC, AR5, WG III, Chapter 6 (2014) and UNEP. The Emissions Gap Report 2015 (2015)
[20] UNEP. The Emissions Gap Report 2015 (2015)
[21] UNEP. The Emissions Gap Report 2015 (2015)
[22] IPCC, AR5, WG III, Chapter 1 (2014)
[23] UNEP. The Emissions Gap Report 2015 (2015)

5. Will a transition to renewable energy address climate change?

A transition to renewable energy for electricity generation is an important component to address climate change. However, a radical change in the way the world produces and uses energy (electricity, fuel and natural gas) is required.

Currently, about 82 percent of the energy produced in the world is obtained by burning fossil fuels –31 percent oil, 29 percent coal and 22 percent natural gas[24].

Because energy is used by different sectors, the IPCC made a comprehensive analysis by sector to identify measures and policies to be implemented in the next 2-3 decades to transform the way energy is produced and used everywhere. Some examples include increasing the deployment of low-carbon energy for electricity generation[25] (currently non-fossil fuel electricity generation is 30 percent –16 percent from hydropower, 5 percent from renewables and 11 percent from nuclear power[26]), increasing the energy efficiency in the industry sector[27], promoting the conversion of vehicles to low-carbon fuels in the transport sector[28] and including on-site renewable energy systems in existing and new buildings[29]. In addition, options were also assessed in the non-energy sector, including improving crop, water and livestock management and reducing deforestation in the agriculture, forestry and land use sector[30].

Several INDCs describe measures in various sectors, such as increasing the share of renewable energy, increasing energy efficiency, using fuel efficiency standards in the transport sector, improving crop and livestock production, establishing waste management and recycling programs and promoting the conservation and sustainable management of forests and reducing deforestation. More than half of the INDCs, however, only focus on measures in the energy sector, with some countries aiming at 100 percent renewable energy supply for the electricity sector [31].

Actions to reduce GHG emissions will have to be implemented in all sectors, and not just to transform the generation of electricity. Producing energy without burning fossil fuels (or decarbornizing the production of energy) will be critically important since world population is estimated to increase by 40 percent, to 10 billion by 2050[32], which in turn will double the demand for energy[33], increase the demand for food, clean water, and other basic human needs.

6. How can net zero CO_2 emissions be reached?

Because collective climate action has been delayed until the Paris Agreement was adopted, much more stringent and expensive options are required to hold global average temperature below 2ºC.

The IPCC concluded that the full implementation of GHG emission reduction measures by all countries in all sectors will not be enough to hold global average temperature below 2ºC. Thus, additional measures will be required to cut CO_2 emissions to net zero, using technologies to reduce CO_2 emissions and to remove CO_2 from the atmosphere. The reason to focus on CO_2 is

[24] Key World Energy Statistics, International Energy Agency (2015)
[25] IPCC, AR5, WG III, Chapter 6 (2014)
[26] Key World Energy Statistics, International Energy Agency (2014)
[27] IPCC, AR5, WG III, Chapter 10 (2014)
[28] IPCC, AR5, WG III, Chapter 8 (2014)
[29] IPCC, AR5, WG III, Chapter 9 (2014)
[30] IPCC, AR5, WG III, Chapter 11 (2014)
[31] Synthesis report on the aggregate effect of the INDCs (FCCC/CP/2015/7) and UNEP. The Emissions Gap Report 2015 (2015)
[32] World Population Prospects: The 2015 Revision, United Nations Population Division (2015)
[33] IPCC, AR5, WG III, Chapter 7 (2014)

that it accounts for 65 percent (or about 35 $GtCO_2$) of global GHG emissions as a result of the burning of fossil fuels[34].

One technology to reduce CO_2 emissions is carbon capture and storage (CCS). These large-scale industrial plants capture CO_2 (from carbon-fueled power plants, refineries, cement plants and steel mills) and store it before it reaches the atmosphere by injecting it deep underground. These CCS plants are expensive, have not been tested at large-scale, and potentially pose risks, such as leakage of CO_2 to water, soil or back into the atmosphere. Thus, accelerated research into their financial and environmental viability is needed. Currently, about a dozen CCS plants in the world capture less than 0.1 percent of CO_2 emissions (or about 0.036 $GtCO_2$)[35].

One technology that could produce energy and remove CO_2 from the atmosphere is the production of bioenergy combined with CCS. The production of energy by burning biomass (such as fuelwood and agricultural residues) coupled with CCS could offer negative emissions because the CO_2 absorbed by trees and plants during their growth can be captured and stored deep underground. There are risks and challenges associated with these technologies, also known as negative emission technologies, such as competition for food, land and water to grow the necessary biomass to produce bioenergy sustainably, which could negatively impact livelihoods. Other risks are simply not known, because there are currently no large-scale bioenergy with CCS plants in the world[36].

The inadequate INDCs have accelerated the need to depend on these technologies. To meet the 2ºC target, global CO_2 emissions should be net zero by 2060-2075[37].

To cut CO_2 emissions to net zero requires not only drastically reducing emissions but also increasing the removal of CO_2. Currently, the oceans, trees and plants (or carbon sinks) remove about half of anthropogenic (or man-made) CO_2 emissions[38]. Extensive reforestation and conversion of land into forest (afforestation) activities could considerably increase the removal of CO_2. But the planting of new forests will not be enough to cut CO_2 emissions to net zero because it would imply expanding the current world's forest cover, at least, twofold. Such massive expansion, though, is constrained by available land. Thus, the large-scale utilization of negative emission technologies will be required. However, the dependence on these negative emission technologies as an option to control climate change is unproven[39]. Even if new negative emission technologies are developed to remove CO_2 from the atmosphere, their impact in controlling climate change will not be immediate –global temperature will continue to increase for decades, after these negative emission technologies are applied[40].

The high risks and costs of further postponing decisive climate action, such as the dependence on unproven negative emission technologies, can be reduced by raising the ambition of the INDCs. Taking earlier action will increase the options of feasible and more cost-effective measures to reduce global GHG emissions[41], and most importantly, will outweigh the risks and damage costs arising from the changing climate[42].

[34] IPCC, AR5, WG III, Chapter 1 (2014)
[35] IPCC, AR5, WG III, Chapter 1 (2014)
[36] IPCC, AR5, WGIII, Chapter 6 (2014)
[37] UNEP The Emissions Gap Report 2015 (2015)
[38] IPCC, AR5, WG I, Chapter 6 (2013)
[39] Betting on Negative Emissions, Nature Climate Change (2014) and UNEP The Emissions Gap Report 2015 (2015)
[40] IPCC, AR5, WG I, Chapter 6 (2013)
[41] UNEP The Emissions Gap Report 2015 (2015)
[42] The Economics of Climate Change, The Stern Review (2006)

7. What else needs to be done?

While efforts to reduce GHG emissions are undertaken, the climate will continue to change. Thus, risks due to the impacts of climate change will continue to be felt everywhere. Although some risks are unavoidable[43], adaptation measures will lessen the risks and negative impacts on key economic sectors, human health, livelihoods and biodiversity[44].

The IPCC analyzed adaptation measures in freshwater resources, food production systems, coastal systems and low-lying areas, urban and rural areas and marine systems. Some examples include rainwater harvesting, improving water management for agriculture, altering cultivation and sowing times for key crops, breeding additional drought-tolerant crop varieties and good-quality, affordable, and well-located housing in urban areas[45].

Adaptation is also one of the key elements of the Paris Agreement. Most pledges from developing countries include adaptation plans; however, actions are conditional to the provision of funding for their implementation.

8. Why has the public misunderstood the urgency of climate change?

There are many signs that the climate is already changing. Yet some think that climate change is only going to happen by the end of the century. Because of this common misunderstanding, the urgency of climate change has been misunderstood by most.

The end of the century is the timeframe often used by climate scientists to project changes in the average weather (temperature, precipitation and wind conditions) over a long period of time (usually, 30 years). Using climate models, scientists also analyze how the climate is projected to change decade by decade throughout this century.

Climate change is happening now, and much faster than anticipated. The evidence is what most have been experiencing as unusual weather events, such as changes in average rain patterns leading to floods or droughts, more intense storms, heat waves and wildfires, among others daily examples[46]. Some of these impacts of climate change already had devastating effects on livelihoods, infrastructure and lives.

9. When could the 2°C target be reached?

There is public agreement that a 2ºC increase in global warming should be avoided. In fact, the Paris Agreement set a global average temperature target of well below 2ºC above pre-industrial levels. Some policymakers and civil society groups advocated for a higher ambition target, and a 1.5ºC above pre-industrial levels target was also included. The IPCC has been requested to produce a special report on the impacts, feasibility and costs of the 1.5ºC target.

However, the 1.5ºC target has almost certainly already been missed because of the lack of action to stop the increase in global GHG emissions for the last 20 years. Global average temperature has already reached 1ºC above pre-industrial times in 2015, as reported by the World Meteorological Organization[47]. This is a significant increase, compared to the 0.85ºC above pre-

[43] IPCC, AR5, Synthesis Report (2014)
[44] IPCC, AR5, WG II, Summary for Policymakers (2014)
[45] IPCC, AR5, WG II, Chapters 3-9 (2014)
[46] IPCC, AR5, WG II, Summary for Policymakers (2014)
[47] Status of Global Climate in 2015, World Meteorological Organization (2015)

industrial times in 2012 reported by the IPCC[48]. An additional warming of 0.4-0.5ºC is expected as a consequence of GHGs that have already been emitted. This additional increase in global temperature is due to the slow response of the ocean-atmosphere system to the increased atmospheric concentrations of GHGs[49].

Global GHG emissions are not projected to decrease fast enough, even if all the pledges are fully implemented. Full implementation of the pledges will require the promised US$100 billion per year in financial assistance for developing countries to be realized. As a result, the 1.5ºC target could be reached by the early 2030s and the 2ºC target by 2050[50].

The main concern is not when the 2ºC target will be exceeded, but the impacts of climate change resulting from such an increase in global temperature. Weather-related events due to climate change have doubled in number since 1990[51]. An increase in global average temperature of 2ºC within the next couple of decades implies an additional doubling in the number of these events.

As the number of weather-related events due to climate change continues to rise, their impact on water resources, food production, human health, services and infrastructure in urban and rural areas, among other sectors[52], will be more frequent and intense. Some of the impacts of climate change may be beneficial, while most will not, negatively impacting lives and livelihoods everywhere.

There is still time to slow down the current path towards reaching the 2ºC target within the next few decades. There are two positive aspects towards changing this trend. First, and most importantly, there are still four years before the implementation of the INDCs in 2020. By 2018, all countries agreed to revise their pledges –sufficient time to significantly raise the ambition of actions to reduce GHG emissions and to adopt the necessary policies for their effective implementation in all countries. Second, the IPCC has already committed to improving its communications to make their reports more accessible for the public to understand. ■

[48] IPCC, AR5, WG I, Chapter 2 (2013)
[49] IPCC, AR5, WG I, Chapter 12 (2013)
[50] IPCC, AR5, WG I, Annex II, Table AII-7-5 (2013)
[51] Loss events worldwide 1980 – 2014, Munich RE (2015)
[52] IPCC, AR5, WG II, Technical Summary (2014)