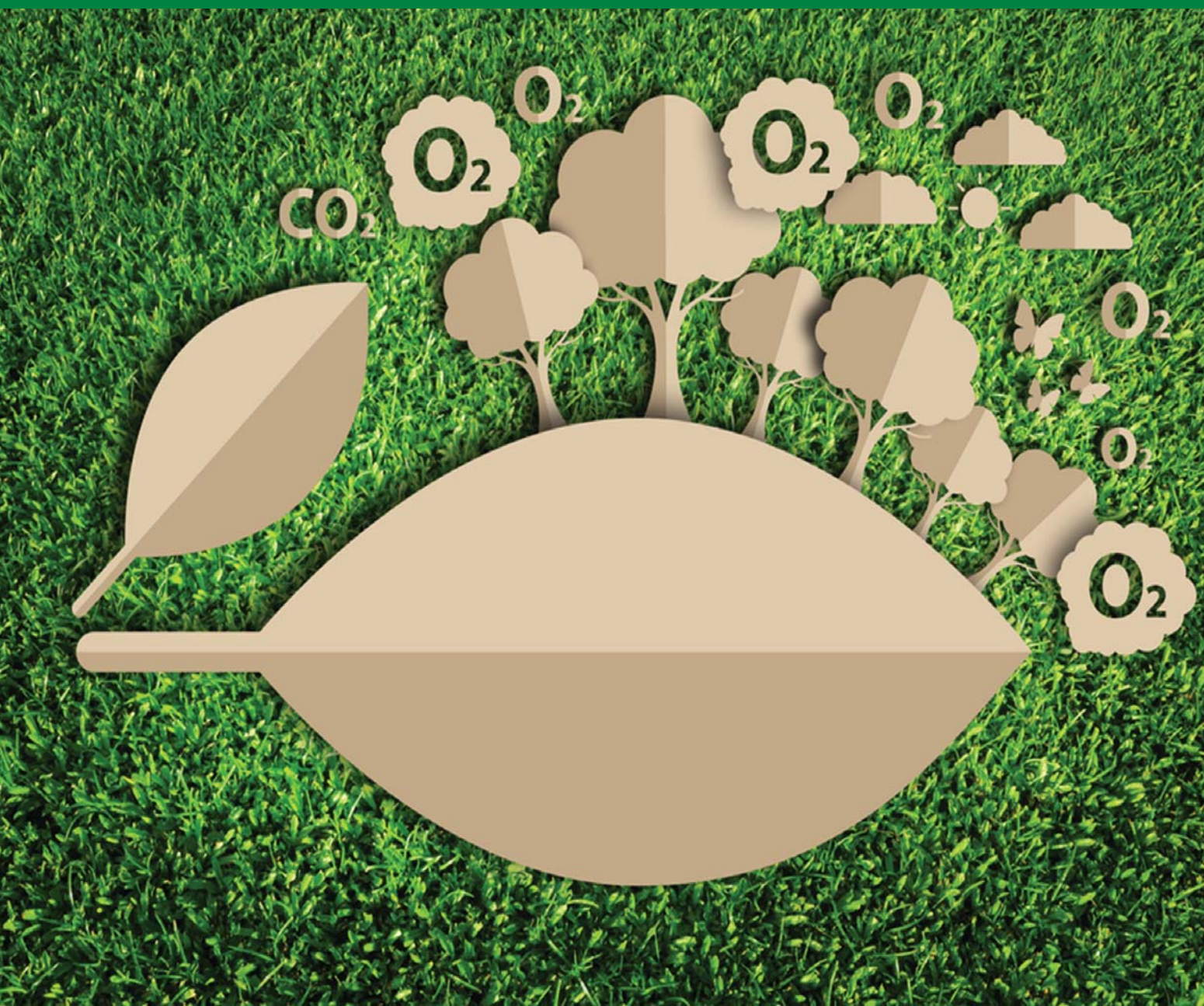
ASIA-EUROPE
ENVIRONMENT FORUM

HANDBOOK FOR ASEAN GOVERNMENT OFFICIALS ON

Climate Change and SDGs



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Handbook for ASEAN Government Officials on Climate Change and SDGs

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HANDBOOK
FOR ASEAN GOVERNMENT OFFICIALS ON CLIMATE CHANGE AND SDGS

Singapore 2016

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LIST OF ABBREVIATIONS

AAP-JRCC	ASEAN Action Plan on Joint Response to Climate Change
AAUs	Assignment Amount Units
ACCI	ASEAN Climate Change Initiative
ADB	Asian Development Bank
ADP	Ad hoc Working Group on the Durban Platform for Enhanced Action
AGBM	Ad hoc Group on the Berlin Mandate
AILAC	Independent Alliance of Latin America and the Caribbean
AMS	ASEAN Member States
AOSIS	Alliance of Small Island States
APA	Ad Hoc Working Group on the Paris Agreement
AR	Assessment Report
ASEAN	Association of South East Asian Nations
AWGCC ASEAN	Working Group on Climate Change
AWG-KP	Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol
AWG-LCA	Ad Hoc Working Group on Long-term Cooperative Action under the Convention
BAP	Bali Action Plan
BAU	Business As Usual
BRs	Biennial Reports
BURs	Biennial Update Reports
CAIT	Climate Analysis Indicators Tool
CBDR-RC	Common but Differentiated Responsibilities and Respective Capabilities
CCAP	Climate Change Action Plan
CCSP	Climate Change Strategic Plan
CCSU	Carbon Capture, Storage and Utilisation
CCTT	Climate Change Technical Team
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CFS	Central Forest Spine
CGE	Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention

CMA	Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement
CMP	Meeting of the Parties to the Kyoto Protocol
COP	Conference of Parties
COW	Committee of the Whole
CPI	Climate Policy Initiative
CTCN	Climate Technology Centre and Network
DNPI	Dewan Nasional Perubahan Iklim
EIG	Environmental Integrity Group
ERUs	Emission Reduction Units
ETS	Emissions Trading Scheme
GEF	Global Environment Facility
GCF	Green Climate Fund
GHG	Greenhouse gases
GtC	Gigatonnes of carbon
IAR	International Assessment and Review
ICA	International Consultation and Analysis
IETA	International Emissions Trading Association
IFAD	The International Fund for Agricultural Development
IMCCC	Inter-Ministerial Committee on Climate Change
INDCs	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
IRZ	Inter-Rivernine Zones
ITMOs	Internationally Transferred Mitigation Outcomes
JI	Joint Implementation
LDCs	Least Developed Countries
LDCF	Least Developed Countries Fund
LEDS	Low Emissions Development Strategies
LULUCF	Land use, land-use change and forestry
MENGO	Malaysia Environmental NGOs
MOECAF	Ministry of Environmental Conservation and Forestry
MOI	Means of Implementation
MRV	Measurement, Reporting and Verification
NAMAs	Nationally Appropriate Mitigation Actions

NAPAs	National Adaptation Programme of Actions
NCCS	National Climate Change Secretariat
NCs	National Communications
NCS	Nusantara Carbon Scheme
NCSD	National Council for Sustainable Development
NDAs	National Designated Authorities
NDCs	Nationally Determined Contributions
NEC	National Environmental Council
NGOs	Non-Governmental Organisations
NIEs	National Implementing Entities
OPEC	The Organisation of Petroleum Exporting Countries
PCCB	Paris Committee on Capacity Building
ppb	Parts per billion
ppm	Parts per million
QELROs	Quantified Emission Limitation and Reduction Objectives
REDD	Reducing emissions from deforestation and forest degradation
REDD+	Reducing emissions from deforestation and forest degradation and the role of conser vation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
REN	Renewable Energy Policy Network
RF	Radiative Forcing
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SCF	UNFCCC Standing Committee on Finance
SCCF	Special Climate Change Fund
SIDS	Small Island Developing States
TEC	Technology Executive Committee
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WG	Working Group
WIM	Warsaw International Mechanism for Loss and Damage
WMO	World Meteorological Organization
WRI	World Resources Institute

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1. INTRODUCTION TO THE SCIENCE OF CLIMATE CHANGE AND LATEST FINDINGS

In this chapter, we present an overview of up-to-date climate change evidence as well as its main drivers. We also elaborate on projected, future climatic changes and their expected environmental and socio-economic impacts both globally, and in the Southeast Asian region.

EVIDENCE OF CLIMATE CHANGE

The latest evidence of climate change was revealed by the Intergovernmental Panel on Climate Change (IPCC), within the framework of the Fifth Assessment Report (AR5) published in 2013 and 2014.

Box 1: The Intergovernmental Panel on Climate Change (IPCC) in a nutshell.

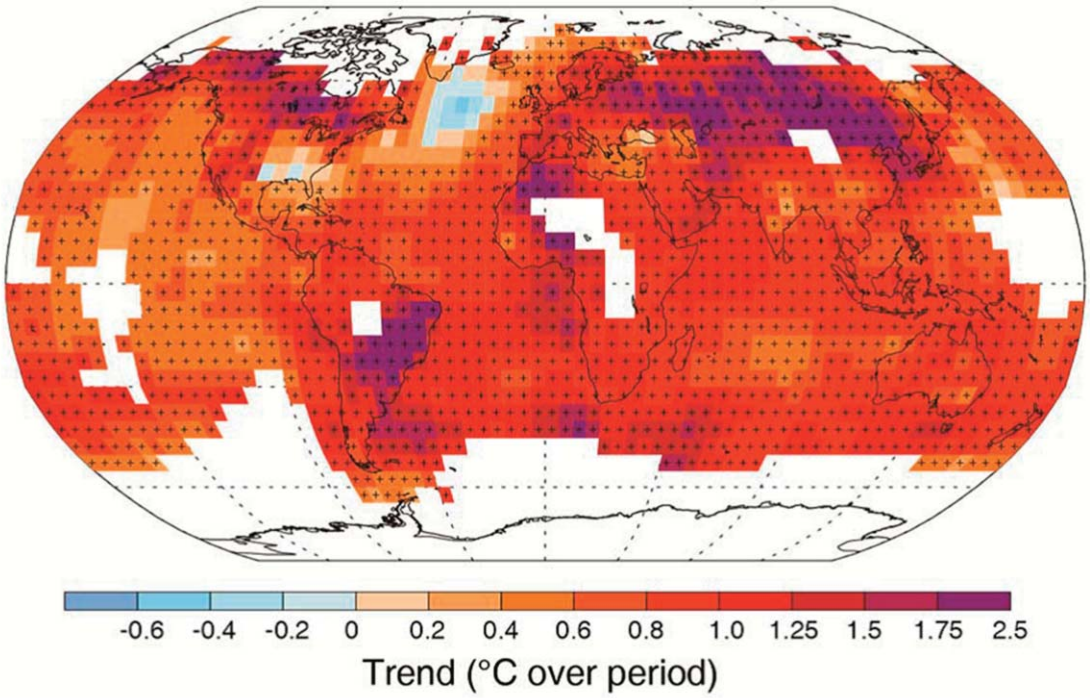
The IPCC, as an intergovernmental body, is the leading scientific body of climate change assessment at the international level. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 with the aim to gather and review up-to-date knowledge on climate change and its socio-economic impacts. On its own, it does not conduct research or collect and assess data, but regularly gathers and reviews contribution from thousands of scientists worldwide. It assesses a variety of research outcomes and ensures the provision of rigorous and policy-neutral scientific information to decision-makers. The work of the IPCC is coordinated by a Secretariat and supported by WMO and UNEP. Governments also participate in the development of its work process and endorse the regularly published IPCC reports.

Source: IPCC website

Based on different scientific studies and observations, Working Group I (WG1) of the IPCC confirmed that the *"warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia"* (IPCC AR5 WG1, 2013). The report also confirmed that *"human influence has been the dominant cause of the observed warming since the mid-20th century"*, while also impacting other observed changes (IPCC AR5 WGR1, 2013). Observed global changes include increasing concentration of greenhouse gases (GHG) in the atmosphere, the warming of the atmosphere and the oceans, rising sea levels, and diminishing snow and ice cover (IPCC AR5 WG1, 2013):

- **Atmosphere:** Between 1880 and 2012, the average combined land and ocean surface temperature increased by 0.85 degrees Celsius (°C) (Figure 1). Moreover, each of the last three decades have been successively warmer. There is a high probability that at the global level, the number of cold days and nights has decreased, while the number of warm days and nights has increased. It is also likely that the frequency of heat waves has increased in large parts of Europe, Asia and Australia. In addition, the frequency or intensity of heavy precipitation has increased in North America and Europe.

Figure 1: Observed changes in surface temperature 1901-2012



Source: IPCC AR5 WG1, 2013

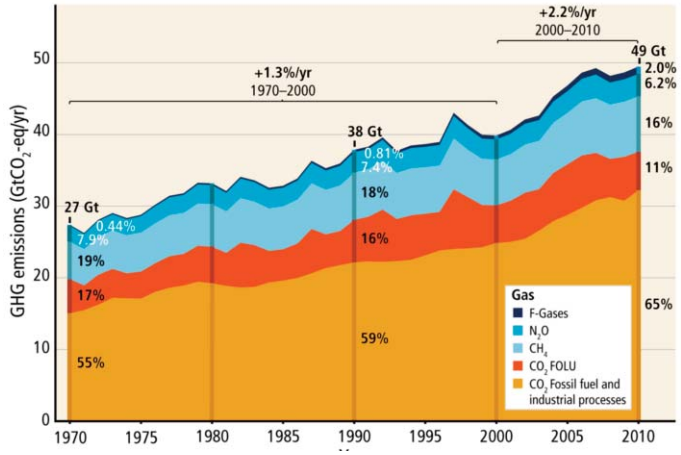
- **Oceans:** The surface level of the oceans (up to 700 m depth) has warmed 0.1°C over each decade since 1971, and it is likely that lower levels of the oceans (between 700-2000 m depth) have also warmed since 1957. It was observed that the high salinity sea regions will become more saline, while low salinity regions become less saline. The pH level of ocean surface water has decreased by 0.1 units since the beginning of the industrial age and is causing acidification of the water.
- **Sea level:** The global average sea level has risen by approximately 0.19m between 1901 and 2010, mainly due to the warming of the oceans and loss in glacier mass.
- **Cryosphere:** The ice cover in Greenland and the Antarctic has been diminishing over the last three decades. It was found with high probability that the Arctic sea ice coverage decreased over the period 1979 to 2012 by 3.5 to 4.1% per decade. Over the same period, the annual mean Antarctic sea ice coverage increased between 1.2 to 1.8%, with the extent increasing in some regions and decreasing greatly in others. In the Northern Hemisphere, the snow cover has decreased in the months of March, April and June, while Arctic temperatures have increased since the mid-20th century.

DRIVERS OF CLIMATE CHANGE

The above-described climatic changes are caused by increasing energy uptake in the climate system, which can be measured by the level of radiative forcing (RF)[1]. As confirmed by the IPCC, the main reason for the increasing RF is the increase in atmospheric concentration of GHGs (IPCC AR5, 2013).

[1] *Greenhouse gases (GHGs), such as carbon dioxide and methane, trap or absorb infrared radiation emitted from the Earth's surface and re-emit radiant energy to the surface of the earth, thereby creating an energy imbalance*

Figure 2: Total annual anthropogenic GHG emissions (GtCO2eq/yr) 1970–2010

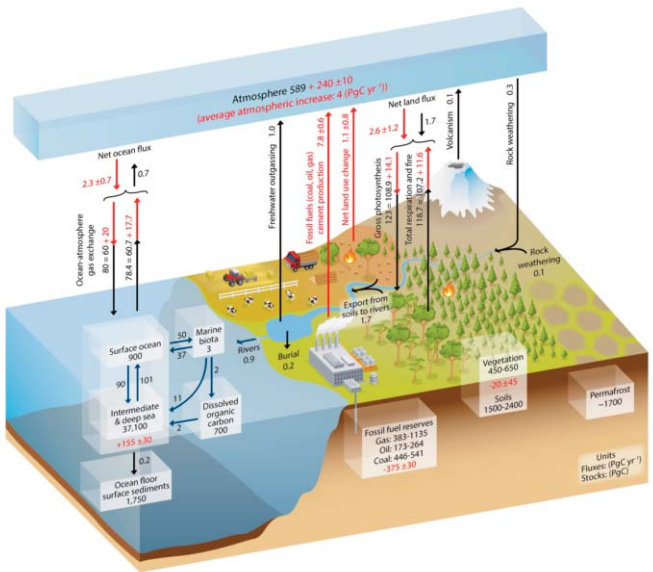


Source: IPCC AR5 WGR3, 2014

While GHGs occur naturally in the atmosphere, and are essential for making the earth livable, the amount of GHGs started to exceed desirable levels as far back as the start of the industrial revolution in the 1750s. WGR1 of the IPCC's AR5 demonstrated that the increase in GHG emissions has been steady since the 1750s[2], and found that the most abundant gas is carbon dioxide (CO_2), as a result of fossil fuel combustion and cement production.

The cumulative anthropogenic CO_2 emissions between 1750 and 2011 were 555 [470 to 640] gigatonnes of carbon (GtC). Out of this, 67.6% can be linked to fossil fuel combustion and cement production while 32.4% to deforestation and other land use change. Although 27.93% was absorbed by the ocean and 28.83% by the natural terrestrial ecosystems, 43.24% GtC accumulated in the atmosphere. Figure 3 illustrates how these different activities come into play and affect the earth's carbon cycle.

Figure 3: Simplified schematic of the global carbon cycle



Source: IPCC AR5 WGR1, 2013

In the future, it is expected that more of the emitted anthropogenic CO_2 will remain in the atmosphere as the absorption capacity of the oceans and terrestrial areas will be partially offset by climate change. Since the surface warming of the planet is caused by cumulative emissions of CO_2, the observed changes will persist for many centuries even if emissions of CO_2 are considerably lowered or stopped in the near future.

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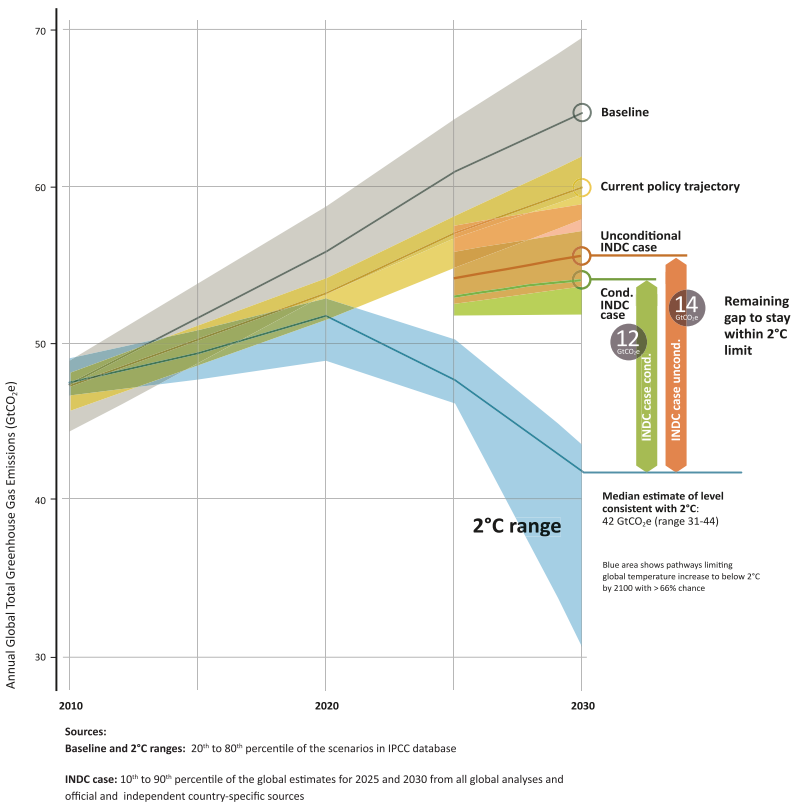
[2] *The atmospheric concentration of carbon dioxide (CO_2), methane (CH4), and nitrous oxide (N_2O) gases were 391 ppm, 1803 ppb, and 324 ppb in 2011, and exceeded the pre-industrial levels by about 40%, 150%, and 20%, respectively.*

GLOBAL CARBON EMISSIONS AND THE IMPACT OF INDCS

Studies assessing the 119 Intended Nationally Determined Contribution (INDCs) submitted by 147 Parties prior to the Paris Agreement at the COP21, the pledges made in the INDCs will result in a reduction of global emission as compared to the pre-INDC trajectories, these will not be sufficient to achieve a least-cost 2°C pathway. The table below presents the key highlights from these reports:

	UNFCCC Synthesis Report	UNEP 2015 Emission Gap Report
Overall Emissions in 2030 in INDC scenario (Gt CO_2e)	56.7 (53.1-58.6)	Conditional INDCs: 54 (52-57) Only Unconditional part of the INDCs: 56 (54-59)
Decrease in Emissions as compared to pre-INDC scenario (Gt CO_2e)	3.6 (0.0-7.5)	(4-6)
Emission gap from the 2°C pathway in 2030 (Gt CO_2e)	15.1 (11.1-21.7)	Conditional INDCs: 12 (10-15) Only Unconditional part of the INDCs: 14 (12-17)
Resulting temperature level	No estimate provided	3°C by 2100

Figure 4: Global GHG emissions under various scenarios and Emissions Gap in 2030



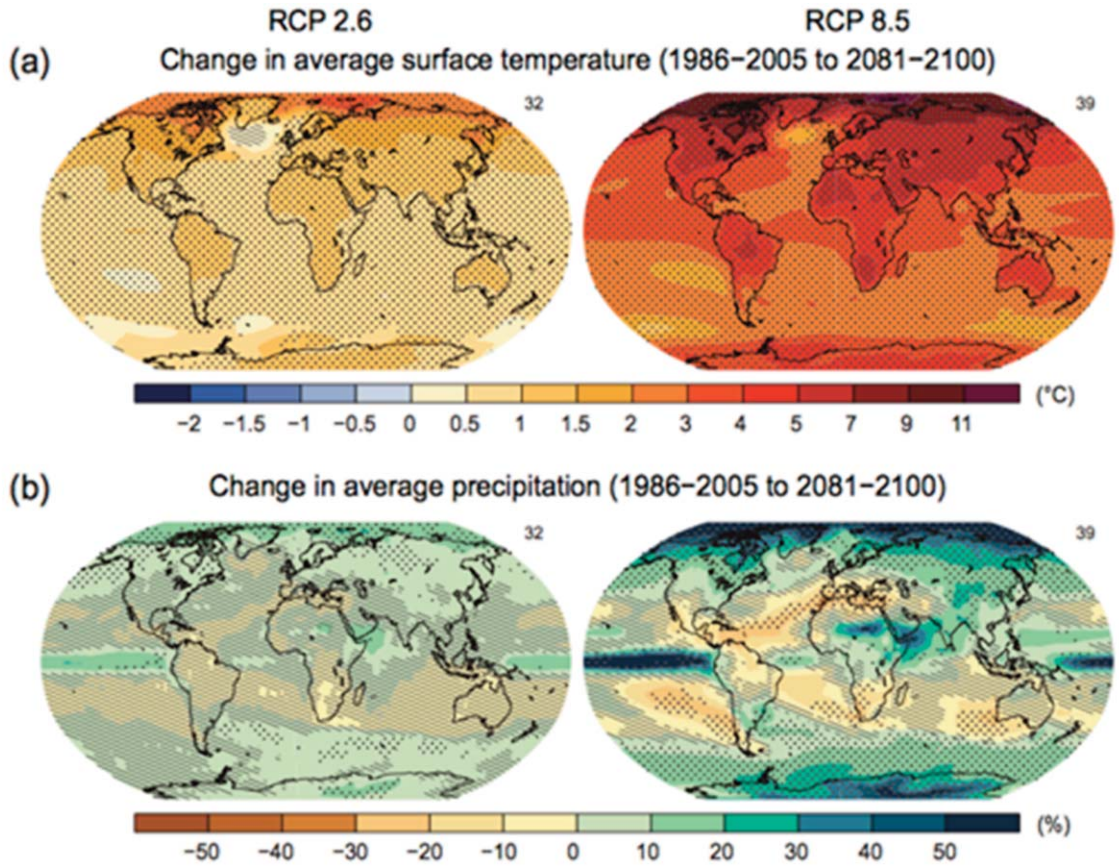
Source: UNEP, 2015

PROJECTIONS OF FUTURE CHANGES IN CLIMATE

As emissions continue to rise, further changes are expected by the end of the century (IPCC AR5, 2013). These may include:

- **Atmosphere:** It is very likely that global surface temperature will increase by 2°C by the end of the century. It is also expected that the contrast between wet and dry regions and seasons will increase.
- **Oceans:** Warming of the oceans will increase by the end of the century and will reach deeper levels of the water, therefore affecting its circulation. Further carbon absorption will lead to further ocean acidification.
- **Sea level:** Average global sea levels will increase in more than 95% of the total ocean area at a much higher rate compared to 1971-2010. Thus a 0.4 to 0.63cm average sea level rise is predicted by the end of the century, and it is foreseen that 70% of all coastlines will be affected by these increases.
- **Cryosphere:** Further decreases in the Arctic sea ice cover and the amount of spring snow in the Northern Hemisphere is expected. While AR5 assigned low probability for the decrease of the total sea ice extent and volume in the Antarctic, new scientific research, released in May 2014, has confirmed a massive glacier system loss in West Antarctica (National Geographic, 2014).

Figure 5: Maps of projected late 21st century annual mean surface temperature change, annual mean precipitation change

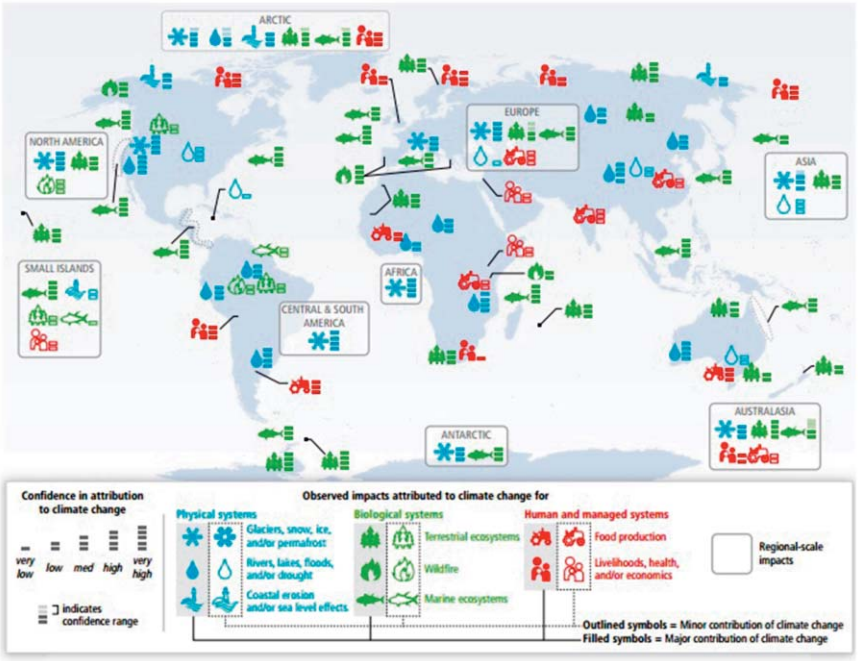


Source: IPCC AR5 WGR1, 2013

SOCIO-ECONOMIC IMPACTS OF CLIMATE CHANGE

Although the impacts will vary, climate change will affect most countries negatively in the coming decades, and will affect the health and state of the physical, biological and human systems.

Figure 6: Observed impacts attributed to climate change for physical, biological, and human and managed systems



Source: IPCC AR5 WG2, 2014

Major observed and projected impacts include:

- **Extreme weather events:** In combination with other climatic changes, these events are mostly likely to affect those who live in coastal areas, and will especially aggravate the life of those in poor living conditions. In future, the frequency and the intensity of weather-induced natural disasters is expected to increase.
- **Water stress:** Due to changes in precipitation patterns, the global area affected by droughts has been increasing since the 1970s. In certain areas of the Mediterranean, Southern Africa and parts of Southern Asia, overall precipitation has been declining, resulting in more frequent drought events. Due to increases in temperatures in mountain areas, mountainous ice-packs have been shrinking in recent decades. These phenomena have a two-fold effect. First, it can reduce the available amount of freshwater for people living in these areas and second, during summer months it can cause flash flood events due to the melting of these ice-packs into the rivers.
- **Biodiversity:** Climate-induced changes have already been affecting various biological processes and species (e.g. earlier start of the spring season). If warming trends continue, many plant and animal species are expected to become extinct by the end of the century.
- **Human health:** Heat-, water- and food-related illnesses can increase due to climate change. In addition, communicable diseases carried by mosquitoes (e.g. malaria, dengue) can reach parts of the world hitherto unaffected, as habitat patterns change.
- **Agriculture:** The yield levels of major crops, such as maize and wheat, have been decreasing since 1981 by 40mt/per year globally. According to IPCC calculations, a 1°C increase

in temperature will result in a 5% yield decrease in tropical, sub-tropical and temperate regions (IPCC AR5, 2013). Yields will be affected by various changes (e.g. rainfall patterns) but also by indirect changes (e.g. climate change-induced changes in biodiversity).

CLIMATE CHANGE AND ITS SOCIO-ECONOMIC IMPACTS IN SOUTHEAST ASIA

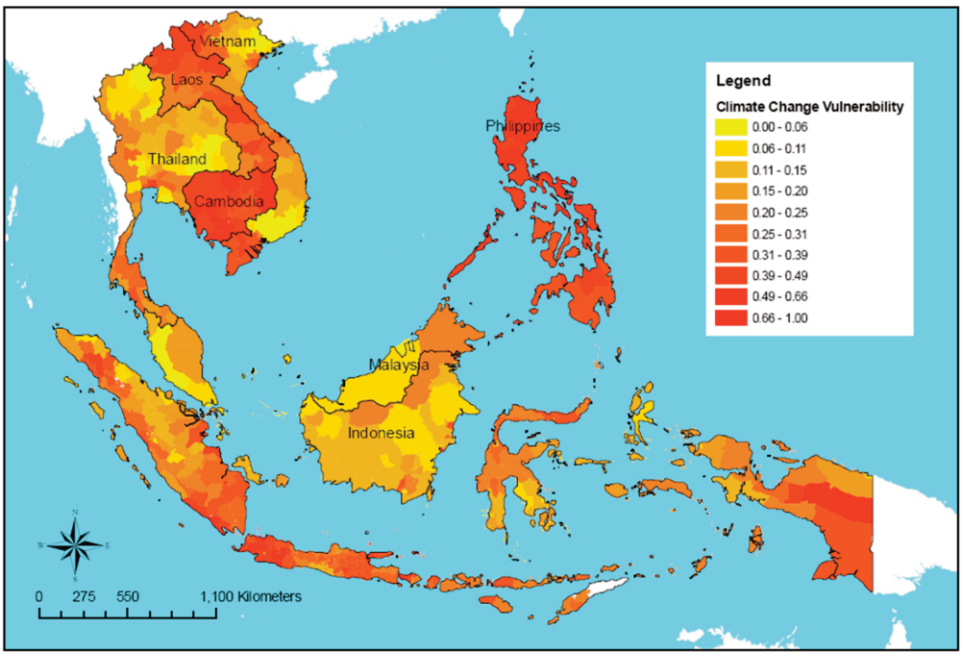
Southeast Asia is considered a highly vulnerable region to climate change and is already being affected by sea level rises, extreme weather events and heat waves (IPCC AR5 WGII, 2014). In this section, we discuss observed and predicted changes in the region as well as observed and projected environmental and socio-economic impacts.

Observed and predicted changes in the climate of the Southeast Asian region include:

- **Annual mean temperature:** Observations since the 1960s have shown that each decade has seen an average increase in temperature of 0.14°C-0.20°C (IPCC AR5 WGII, 2014). With regard to predicted future changes, the average temperate change in high-latitude areas could increase by a range of 3-6°C by the end of the 21st century.
- **Precipitation:** Although regional and seasonal variations persist, increased precipitation can also be observed in the region, with higher numbers of wet-day and extreme-rainfall days (IPCC AR5 WGII, 2014). In the future, precipitation patterns will likely be more extreme near the centers of tropical cyclones.
- **Extreme weather events:** Increase in frequency of extreme events in the northern parts of Southeast Asia, although they have reportedly decreased in other countries, such as Myanmar (IPCC AR5 WGI, 2014).
- **Sea level rise:** Due to the projected increase in seas levels, it is very likely that a million people in the region will be exposed to an increased risk of flooding (IPCC AR5 WGII, 2014).

Fast population growth and related urbanization trends in the Southeast Asia region will put increased pressure on natural resources, and make urban populations especially vulnerable to the impacts of climate change (ASEAN, 2007). As the national economies of the region rely heavily on their rich natural resources and agricultural production, climate change has the potential to amplify socio-economic differences and decrease the political security of the region (IFAD, 2009).

Figure 7: Climate Change Vulnerability Map of Southeast Asia



Source: Yusuf and Francisco, 2009

Major observed and projected impacts include:

- **Water stress:** The region is already affected by changes in rainfall patterns, droughts, floods and cyclones. These changes severely impact the lives of the rural poor, who tend to lack adaptive capacity (IFAD, 2009). In the future, increased droughts as a result of changing precipitation patterns and reduced snow-fed river flows may result in decreased food security, more frequent forest fires, and increased exposure to infectious diseases (IPCC AR5 WGII, 2014). Increases in population density, agricultural and industrial activities could worsen water shortages. In addition, extreme rainfall events will cause further problems, by increasing the number of flooding events. While overall the region will be negatively impacted by water stress, localized impacts of climate change may be slightly positive, e.g. future water shortages may become less frequent in the Philippines (IFAD, 2009).

- **Biodiversity:** The region is rich in biodiversity and natural resources[3]. The ASEAN region occupies only 3% of the earth's total surface but is home to over 20% of all known plant, animal and marine species, providing food, medicine, shelter, clothing and other biological goods and ecosystems services to almost 600 million people in ASEAN (ASEAN, 2012). Coral reefs are prone to sea-temperature rise, while mangrove wetlands can be affected by sea-level rise and changing rainfall patterns (IFAD, 2009). Changes in drought frequency and patterns can influence flowering in lowland rainforests in the region (IPCC AR5 WG2, 2005). Droughts may also negatively amplify the fragmentation of forests (IPCC AR5, WG1) and result in degradation of tropical forests, more frequent forest diseases and forest fires (IFAD, 2009). However, studies also found that forests and vegetation can also experience positive effects of climate change, e.g. Thailand's total tropical forest cover may increase (IFAD, 2009). Overall, the degradation of ecosystems can seriously impact access to food and water as well as to natural resources (e.g. timber) for commercial purposes (IPCC AR5 WG2, 2005).

- **Agriculture:** Changing precipitation patterns will affect water quality and supply in the region, which will make irrigation systems more vulnerable. An increase in temperature may have various effects on crop yields. Moderate temperature increase (below 2 °C) may be beneficial for rice yields in Indonesia and Malaysia, but would already negatively affect the Philippines (IFAD, 2009). The sensitivity of major cereal and tree crops will mostly affect the rural poor, who rely on traditional agricultural methods and marginal lands (IFAD 2009).

- **Coastal areas:** ASEAN countries have a total combined coastline length of 173,000 km, with 14% of the world's marine fish population (IFAD, 2009). Due to geological and geographical characteristics, population increase and infrastructure developments, the coastal zones of the region are highly prone to climate change. Major climatic changes include increases in sea-surface temperature and sea-levels, tidal variations, tropical cyclones and rainfall increase. These can negatively affect coastal and marine ecosystems, increasing the risk of coastal erosion and land loss, sea flooding and salinization of freshwater, as well as result in coastal hazards and displacement of several million people. Risks are especially high in the delta regions of Bangladesh, Myanmar, Thailand and Viet Nam, as well as in the lower areas of Indonesia, Malaysia and the Philippines (IFAD, 2009).

Overall, the Southeast Asian region is set to be highly affected by future climatic changes, which will affect the social and economic sectors of each nation in different ways. Observed and potential climate changes and related socio-economic impacts at the national level are discussed in detail in Chapter 6.

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[3] *40% of all world species live in the Southeast Asian forests, 35% of the mangrove forests, and about 30% of the coral reefs of the world are also found in the region. Indonesia, Malaysia and the Philippines together represent around 80% of global biological diversity. See Trevisan, J. (2013) The common framework for climate policy in South-East Asia, ICCG Reflection No. 13/2013, International Center for Climate Governance, January 2013.*

2. GLOBAL CLIMATE NEGOTIATIONS

In this chapter we provide an overview of the development of global climate negotiations and the processes leading to the adoption of the Paris Agreement in December 2015. Major climate mechanisms and the role of party groupings in the negotiations are also discussed.

INTRODUCTION TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

Although it has been well-known since the 1960s that global average temperatures have been increasing, it was only in 1990 that the IPCC first confirmed global warming, and called for action to reverse the process.

The United Nations Framework Convention on Climate Change

The UN Framework Convention on Climate Change (UNFCCC) is an intergovernmental treaty developed to address the problem of climate change. The Convention, which sets out an agreed framework for dealing with the issue, was negotiated from February 1991 and was adopted at the June 1992 UN Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil, also known as the Rio Earth Summit (UNFCCC, 2016b). The UNFCCC entered into force on 21 March 1994, 90 days after the 50th country's ratification had been received. As of 2016, 197 countries have ratified the Convention and these are called Parties to the Convention. The ultimate objective of the Convention is to *"stabilise greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system"* (UNFCCC, 2016b).

The Conference of the Parties (COP), the main decision body of the UNFCCC, meets annually to review progress and initiate further action. Since 2005, the COP also acts as the Meeting of the Parties to the Kyoto Protocol (CMP)[4] wherein all decisions related to the implementation of the Kyoto Protocol are undertaken. COPs are meant to be held in Bonn, Germany (where the UNFCCC Secretariat is based), unless a Party offers to host a session. Together with the COP Presidency, the session venue tends to rotate between the main global regions: Africa, Asia, Eastern Europe, Latin America and the Caribbean, Western Europe and Others.

The permanent secretariat of the UNFCCC has been located in Bonn, Germany, since 1996. The secretariat provides organisational support and technical expertise to the UNFCCC negotiations and institutions and facilitates the flow of authoritative information on the implementation of the Convention.

The COP is supported by two permanent subsidiary bodies. The Subsidiary Body on Scientific and Technical Advice (SBSTA) provides information and advice on scientific and technological matters as relating to the Convention while the Subsidiary Body for Implementation (SBI) develops recommendations to assist the COP in reviewing and assessing implementation of the Convention and in preparing and implementing its decisions. The SBSTA and SBI meet twice each year concurrently. One of these two yearly meetings generally takes place in parallel with the COP.

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[4] *Further information on the Kyoto Protocol is provided in the later sections of this chapter.*

In addition, a number of committees have been established to support the COP and international agreements linked to the UNFCCC (for example the Kyoto Protocol). These committees include the Compliance Committee of the Kyoto Protocol, the CDM Executive Board, the JI Supervisory Committee, the Climate Technology Centre and Network (CTCN), Adaptation Committee, Standing Committee on Finance, the Least Developed Countries Expert Group, the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (CGE), the Global Environmental Facility (GEF) and the Green Climate Fund (GCF).

Box 2: More information about the UNFCCC and the Kyoto Protocol

- **UNFCCC website:** It includes a variety of information, providing essential background information, the mechanisms and latest developments. It also gathers country communications, submissions and presents emissions data.

  URL: www.unfccc.int

- **UNFCCC handbook:** Published in 2006, it provides an overview of the processes of international climate change negotiations and activities related to the implementation of the Convention, including adaptation to climate impacts, mitigation of climate change, finance, technology transfer, capacity-building, and reporting.

  URL: unfccc.int/resource/docs/publications/handbook.pdf

- **IPCC website:** As the leading scientific body on climate change, it includes a wealth of information on the activities of its working groups, and provides access to its assessment reports and publications, which serve as the scientific bases for UNFCCC negotiations and aims to support policy and decision-makers.

  URL: www.ipcc.ch

- **Training materials of the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (CGE)** are gathered on the UNFCCC website to facilitate the preparation of national communications by non-Annex I Parties. This collection of documents offers guidance on vulnerability, mitigation and adaptation assessments as well as on GHG inventories.

  URL:unfccc.int/national_reports/non-annex_i_natcom/training_material/methodological_documents/items/349.php

- **Climate Change Information Network (CC:iNet):** Hosted by the UNFCCC website, it serves as a clearing house mechanism to the Parties and provides them with a variety of materials promoting education, training and awareness-raising.

  URL: unfccc.int/cc_inet/cc_inet/items/3514.php

THE KYOTO PROTOCOL

The first meeting of the Conference of Parties (COP1), was held from 28 March to 7 April 1995 in Berlin, Germany. At COP1, Parties expressed concern over the adequacy of commitments to mitigate climate change through addressing anthropogenic emissions by source and removals by sinks of all greenhouse gases as contained in Article 4 of the Convention. Parties adopted a decision (Decision 1/CP.1) establishing the formation of an open-ended Ad hoc Group on the Berlin Mandate (AGBM). This began a process to strengthen the commitments of Annex I Parties to reduce GHG emissions beyond the year 2000 through the adoption of a protocol or other legal agreement. From September 1995 to October

1997 and over 8 negotiation sessions of the AGBM, a total of 44 countries submitted over 94 documents to the AGBM on methodologies, formulae, indicators relating to levels of emission reductions, policies and measures and elements of the protocol or legal agreement[5].

At COP3 held from 1-11 December 1997 in Kyoto, Japan[6], a specific committee, Committee of the Whole (COW) was created to deal with the negotiations of the draft texts of the Protocol. Key issues in the negotiations were institutions and mechanisms of Joint Implementation, CDM and Emissions Trading, and the Quantified Emission Limitation and Reduction Objectives (QELROs).

At the closing plenary, the Kyoto Protocol submitted by the COW was unanimously adopted. Under the Protocol, overall emissions of 38 industrialised countries, referred to as Annex I Parties, would be reduced by at least 5% below 1990 levels over the period 2008-2012 or 30% below projected levels. The range of emission reduction commitments for Annex I Parties ranged from +10% to –8% below 1990 levels. Each Party was accordingly allocated a number of emission units, called Assignment Amount Units (AAUs). One AAU is equivalent to 1 tonne of CO_2. For example, Canada's reduction target was 6% below the 1990 emission level of 457 million tonnes, and thus allocated a total of 430 million AAUs each year.

As a result of the United States' non-ratification[7], the emission reduction pledges of the remaining 37 developed nations and economies in transition were reduced to an average of 4.2% below 1990 levels.

Doha Amendment to the Kyoto Protocol

Following the entry into force of the Kyoto Protocol in May 2005, the first meeting of the Conference of the Parties serving as the Meeting of Parties to the Kyoto Protocol (CMP1) was held in conjunction with COP 11 from 28 November to 9 December 2005, in Montreal, Canada. In according with Article 3 of the Protocol (UNFCCC, 2016c), the CMP1 established an Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) to negotiate a second commitment period to the Kyoto Protocol. After 7 years and many rounds of negotiations, and overcoming key issues such as emission reduction targets, length of the second period and carrying over of unused emission credits into the second period, the COP in December 2012, adopted the Doha Amendment to the Kyoto Protocol (UNFCCC, 2016d). Under the Doha Amendment, developed countries pledged to reduce their GHG emissions by at least 18% by 2020 below 1990 levels.

As of 3 May 2016, 65 countries had ratified the Doha Amendment, while a total of 144 instruments of acceptance are required for the Amendment's entry into force.

Mechanisms under the Convention and the Kyoto Protocol

While the Kyoto Protocol requires developed countries to reduce their emissions, it is also important that these reductions are achieved in the most economically effective manner. For example, for a country that has already adopted low carbon technology, it may be more expensive to reduce additional emissions as compared to a developing country where such opportunities may be available for a lower marginal cost.

Based on this understanding, three mechanisms have been introduced under the Kyoto Protocol:

- **Emissions trading:** Defining GHG emissions as a commodity allows countries to sell permitted, but not used, emissions to other countries. Apart from this, countries can also

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[5] *See UNFCCC (1996) Implementation of the Berlin Mandate: Comments from Parties, Note from the Secretariat, Addendum, Ad Hoc Group on the Berlin Mandate at its Fourth Session, Geneva, 9-19 July 1996, UN Doc. FCCC/AGBM/1995/MISC.1/Add.2*

[6] *UNFCCC (1998) Report of the Conference of the Parties on its Third Session, Kyoto, 1 to 11 December 1997, UN Doc. FCCC/CP/1997/7.*

[7] *See Kirby A. (2001) "US blow to Kyoto hopes", BBC News, 28 March 2001.*

trade in removal units from land use, land-use change and forestry (LULUCF), such as reforestation, and from specific emission reduction projects via the Joint Implementation and CDM. To date, the largest emission trading scheme is operated by the European Union. As of 2016, there are more than 19 emission trading systems (ETS) currently operating at supranational, national, regional and local levels. These include ETS in China, Kazakhstan, Republic of Korea, New Zealand and states such as California, Quebec and cities such as Tokyo (IETA, 2016).

- **Joint Implementation (JI):** This mechanism is defined in Article 6 of the Kyoto Protocol, allows a country with an emission reduction or limitation commitment under the Kyoto Protocol (Annex B Party) to earn emission reduction units (ERUs) from an emission-reduction or emission removal project in another Annex B Party, each equivalent to one tonne of CO_2, which can be counted towards meeting its Kyoto target. Joint implementation offers Parties a flexible and cost-efficient means to fulfil a part of their Kyoto commitments, while the host Party benefits from foreign investment and technology transfer.

- **Clean Development Mechanism (CDM):** The CDM supports emissions reduction projects in developing countries by providing such projects with certified emission reduction (CER) credits, which can then be traded or sold. By purchasing CERs, developed countries are allowed to a meet a part of their own emission reduction targets under the Kyoto Protocol. As of 2016, CERs equivalent to emission reductions of more than 1.6 billion tons of CO_2 equivalent were issued with China, India and the Republic of Korea, the top 3 countries with issued CERs (UNEP DTU, 2016).

At the same time, in order to further support developing countries in action against climate change, the UNFCCC has created three additional mechanisms:

- **Technology Mechanism:** This aims to promote technology development and support technology transfer that enables climate change mitigation and adaptation in developing countries. Established in 2010, the mechanism is being implemented by the Technology Executive Committee (TEC) and the CTCN. To identify the priority technology needs of developing countries, Party-driven technology needs assessments are carried out, involving different stakeholders.

- **Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+):** REDD+ targets developing countries and aims to promote emission reductions in the forestry sector by addressing deforestation and supporting sustainable forest management. By assigning market value to the carbon stored in forests, it provides incentives to developing countries to implement mitigation projects in the forest sector. Most recently, within the Warsaw Framework for REDD+, decisions were adopted at COP19 with regard to implementation, financing, monitoring, verification and reporting of the mechanism.

- **Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts (WIM):** Established at COP19 in Warsaw, this mechanism aims to promote integrated approaches to address loss and damages resulting from climate change impacts in developing countries. It aims to build knowledge on managing climate risks, strengthening co-operation among various stakeholders, and promoting and enhancing disaster risk management actions. To guide the implementation of the Mechanism, the COP established an Executive Committee for it in Warsaw. The mechanism is planned to undergo review at the COP22 in November 2016.

Box 3: More information about the UNFCCC mechanisms

Emissions Trading:

- UNFCCC website on emissions trading.

  URL: unfccc.int/kyoto_protocol/mechanisms/emissions_trading/items/2731.php

- UNCTAD: International Rules for Greenhouse Gas Emissions Trading. Defining the principles, modalities, rules and guidelines for verification, reporting and accountability.

  URL: unctad.org/en/Docs/pogdsgfsbm6.en.pdf

- The European Commission: The EU Emissions Trading System.

  URL: ec.europa.eu/clima/publications/docs/factsheet_ets_en.pdf

Joint Implementation:

- The UNFCCC website on Joint Implementation.

  URL: ji.unfccc.int/index.html/

- French Inter-ministerial Greenhouse Gas Mission: Climate Change: Guide to the Kyoto Protocol Mechanisms. The Joint Implementation mechanism.

  URL: www.ffem.fr/webdav/site/ffem/shared/ELEMENTS_COMMUNS/U_ADMINISTRATEUR/ 5-PUBLICATIONS/Changement_climatique/GuideC_projets_Kyoto_angl.pdf

Clean Development Mechanism (CDM):

- UNFCCC website on CDM.

  URL: cdm.unfccc.int

- The Clean Development Mechanism: A review of the First International Offset Program prepared for the Pew Center on Global Climate Change.

  URL:www.c2es.org/docUploads/clean-development-mechanism-review-of-first-international-offset-program.pdf

Technology Mechanism:

- UNFCCC Technology Information Clearing House.

  URL: unfccc.int/ttclear/pages/home.html

REDD+:

- REDD Web Platform.

  URL: unfccc.int/methods/redd/redd_web_platform/items/4531.php

- FIELD: Guide for REDD+ negotiators.

  URL: www.field.org.uk/guides/guide-for-redd-plus-negotiators-august-2013

- REDD+ Partnership website.

  URL: reddpluspartnership.org/en/

Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts:

- UNFCCC introduction.

  URL: unfccc.int/adaptation/workstreams/loss_and_damage/items/8134.php

- The Work Programme of the Mechanism.
  URL: unfccc.int/adaptation/workstreams/loss_and_damage/items/6056.php
- GermanWatch: Roadmap to Relevance for the Warsaw International Mechanism.
  URL: www.lossanddamage.net/4952

Compliance with the Convention and Kyoto Protocol

Articles 4 and 12 of the Convention require all Parties, taking into account their Common But Differentiated Responsibilities and Respective Capabilities (CBDR-RC), to communicate information related to implementation of their climate targets. These include a national inventory of anthropogenic emissions by source and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol; general description of steps taken or envisaged by the Party to implement the Convention; and any other information that the Party considers relevant to the achievement of the objective of the Convention[8]. These national communications were to be submitted by Annex I Parties every 4 years following decisions for each submission by the COP.

Similarly, the Kyoto Protocol imposed two regular, on-going reporting requirements for Annex I Parties: an annual report and a periodic national communication. In both cases, Parties were to submit the information elements as required by the Convention and include additional information related to the implementation of the Kyoto Protocol, as well as support developing countries in their mitigation and adaptation activities through technology transfer and financial assistance.

At COP16 in Cancun, as part of the Cancun Agreements[9], it was decided that developed country Parties should enhance reporting in national communications and submit biennial reports, which outline progress in achieving emission reductions and the provision of financial, technology and capacity-building support to non-Annex I Parties, building on existing reporting and review guidelines, processes and experiences. Decision 1/CP.16 also established a new process, international assessment and review (IAR), under the Subsidiary Body for Implementation (SBI) that aims to promote the comparability of efforts among all developed country Parties with regard to their quantified economy-wide emission limitation and reduction targets.

For developing countries, reporting is now implemented through national communications (NCs) and biennial update reports (BURs). Developing country Parties are required to submit their first NC within 3 years of entering the Convention, and every 4 years thereafter.

The first BUR should be, consistent with the Party's capabilities or level of support provided, submitted by December 2014, and every 2 years thereafter. LDC Parties and SIDS can submit BURs at their own discretion. These BURs will be subject to a process called International Consultation and Analysis (ICA), also under the purview of the SBI.

The secretariat, the IPCC, the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (CGE), and related external sources provide tools and materials to facilitate measuring, reporting, and verification in developing countries in accordance with the guidelines to the Convention.

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[8] *United Nations (1992) United Nations Framework Convention on Climate Change UN Doc. FCCC/INFORMAL/84/Rev.1, 9 May 1992, Articles 4 and 12.*

[9] *UNFCCC (2010) Decision 1/CP.16, The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention, UN Doc. FCCC/CP/2010/7/Add.1, 15 March 2011.*

Assessment of the Kyoto Protocol

Since it came into force in 2005, the Kyoto Protocol has attracted a number of viewpoints with regards to its achievements and effectiveness. In 1998, Tom Wigley, a renowned climate scientist, called the Protocol an important first step while pointing out that much more must be done after Kyoto to reduce future global warming by a significant amount (Wigley, 1998). In 2015, Climate Home concluded that on a technical level, the Kyoto Protocol has seen dramatic developments that it can account for[10]. The Kyoto Protocol's main achievements include: introduction of a multinational carbon market; delivery of new rules for reporting, accounting and verifying emissions; support to poorer countries through the establishment of the Adaptation Fund; incentivising green investments in the developing world; and the institution of rules-based architecture. All of these achievements have influenced the creation of low carbon legislation across the world – notably the UK's 2008 Climate Change Act.

On the occasion of the 10th anniversary of the Kyoto Protocol, the UNFCCC Executive Secretary Christiana Figueres said that it was a remarkable achievement and that she is "... convinced that without the Kyoto Protocol and its various mechanisms we would not be as far forward as we are today in respect to, for example, the growing penetration of renewable energies. Its vision has also assisted in spawning new and innovative initiatives like supporting developing countries to reduce emissions from deforestation and forest degradation"[11].

In contrast, critics of the Protocol have noted that while Kyoto Protocol was adopted as an internationally binding agreement, its binding nature is rather limited and virtual in practice (Morel & Shishlov, 2014). This is evident from United States' non-ratification early in 2001 and Canada's withdrawal from the Protocol in December 2011 to avoid penalties amounting to USD14 billion for noncompliance with its emission reduction target[12].

The large majority of the Kyoto Protocol signatories can claim some success since the total greenhouse emissions for 36 Parties at the end of that first commitment period were 22.6% lower than the 1990 base year. But as critics have since pointed out, this overachievement came about with little or no effort. Prior to and in the negotiation years of the Protocol, emissions in the Eastern European countries were falling dramatically following the breakup of the Soviet Union. With a target of about 4% below the 1990 base year, much of the overall emission reductions took place before the Protocol was signed (the so called "hot air" emissions). For example, by 2010, Russia's CO2 emissions were 34% lower than in the base year and Ukraine's had fallen by 59% (Schiermeir, 2012). The United Kingdom's 12.6 % GHG reduction target was also easily met through gas from the North Sea and closure of coal mines.

The global impact of the Kyoto Protocol has also been questioned. In the 1990s, the emissions of Kyoto Protocol countries were at about 33% of world emissions. With the United States' refusal to ratify the Protocol and Canada, Japan, New Zealand and the Russian Federation not taking on reduction targets in the second commitment period, the remaining 34 will account for only 15% of the global emissions. Furthermore, in spite of the Kyoto Protocol countries reducing their emissions, overall global emissions have soared. Data provided by the World Resources Institute (WRI) (Freidrich and Damassa, 2014) shows that global CO2 emissions in 2011 were by 39% higher than they were in year 2000. Most of the increases came from China, India and the United States – the top three emitters who are not bound by emissions reduction under the Protocol.

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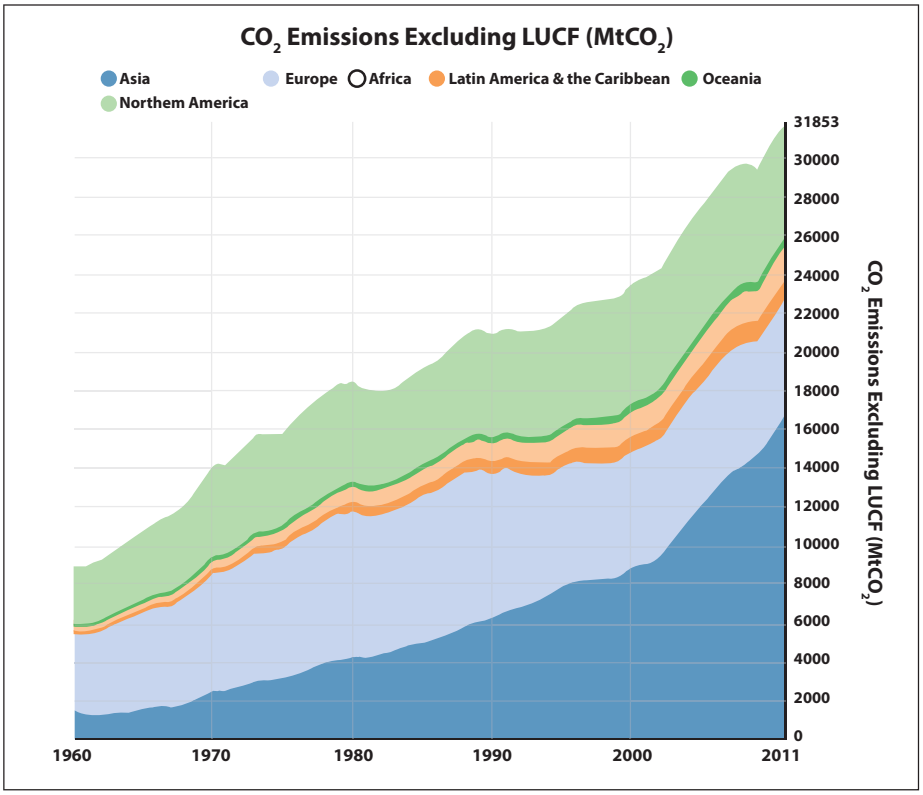
[10] *King, E. (2015) "Kyoto Protocol: 10 years of the world's first climate change treaty", Climate Home, 16 February 2015. URL: http://www.climatechangenews.com/2015/02/16/kyoto-protocol-10-years-of-the-worlds-first-climate-change-treaty/*

[11] *UNFCCC, 'Kyoto Protocol 10th Anniversary: Timely Reminder Climate Agreements Work', Press Release, 13 February 2015. Available online at: http://newsroom.unfccc.int/unfccc-newsroom/kyoto-protocol-10th-anniversary-timely-reminder-climate-agreements-work/*

[12] *CBC News (2011) "Canada pulls out of Kyoto Protocol", 12 December 2011. URL: http://www.cbc.ca/news/politics/canada-pulls-out-of-kyoto-protocol-1.999072*

Figure 8: Trends in regional contribution towards global CO2 emissions



Source: Freidrich, J. & Damassa, T., 2014

IN SEARCH OF THE NEXT CLIMATE AGREEMENT – THE ROAD TO PARIS

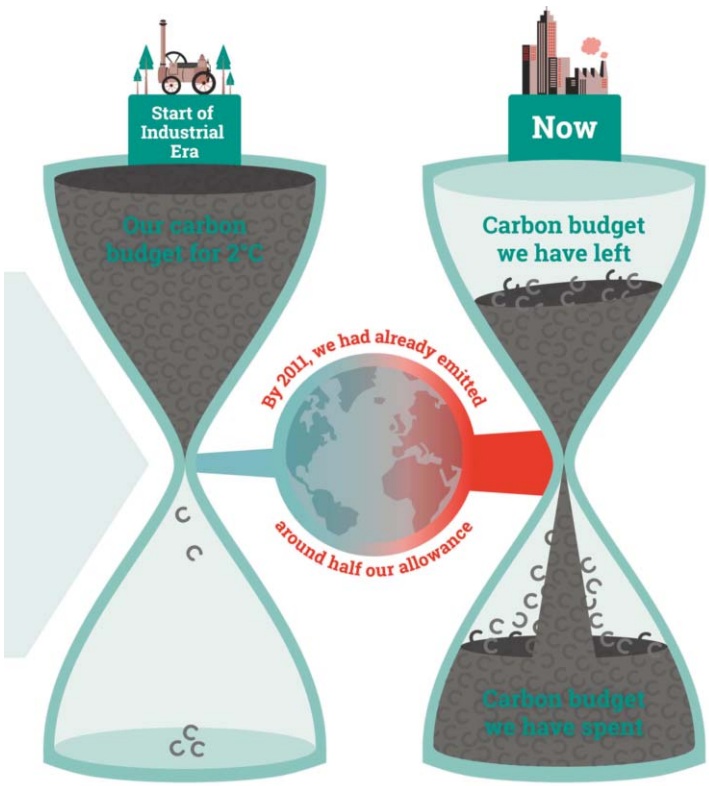
Following the entry into force of the Kyoto Protocol in 2005, Parties began negotiating the way forward post-2012 at COP13 in Bali. One of the key outcomes from subsequent COPs was the Bali Action Plan (BAP) under which a subsidiary body termed Ad Hoc Working Group on Long Term Cooperative Action (AWG-LCA) was created. The objective of this body was "... to launch a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012..." with the goal of reaching an 'agreed outcome' in 2009[13].

While in 2009, COP 15 in Copenhagen was unable to lead to a legally binding outcome, the end result was a political agreement negotiated amongst the heads of states of the US, China, India, Brazil and South Africa. The "Copenhagen Accord" included recognition of: "... the scientific view that the increase in global temperature should be below 2 degrees Celsius"; Annex I (developed) countries' "commitment to implement" economy-wide emissions targets for 2020, and non-Annex I (developing) countries to implement nationally appropriate mitigation actions (NAMAs); for the period 2010-2012, a collective commitment of developed countries to provide new and additional resources approaching USD 30 billion; and achieve collective mobilization of USD 100 billion per year by 2020.

In 2010 at COP16 in Cancún, governments adopted the Copenhagen Accord and agreed to limit global temperature increases below 2 °C, by reducing global GHG emissions. This commitment is challenging, especially in the light of the recently released IPCC report (IPCC AR5, 2013), which suggests that half of the cumulative (or historical) "CO2 emissions budget" that would allow the limiting of global warming to below 2 °C, had already been used up by the end of 2011.

[13] *UNFCCC (2008) Decision 1/CP.13, Bali Action Plan, UN Doc. FCCC/CP/2007/6/Add.1*, 14 March 2008, para. 1.*

Figure 9: Carbon budget



Source: University of Cambridge, Program for Sustainability and Leadership

To accelerate climate actions for keeping global warming below 2 °C, in **2011 at COP17 Durban**, the Parties to the Convention established the basis for creating a new international emissions reduction protocol. This was done by setting up an Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP). The ADP worked in two streams. The first workstream aimed to develop the text of the then so-called 2015 Agreement, a "protocol, another legal instrument or an agreed outcome with legal force" under the Convention that would be adopted by the Parties at COP21 in Paris, France and enter into force in 2020. The second workstream focused on enhancing mitigation actions prior to 2020, before the new 2015 Agreement enters into force.

In **2012 at COP18 in Doha** and in **2013 at COP19 in Warsaw**, and at the intersessional meetings in Bonn, Germany, negotiations under Workstream 1 took place under plenary sessions, roundtable discussions, informal consultations and contact groups, focusing on areas such as the application of Convention principle of common but differentiated responsibility, national circumstances, nationally-determined mitigation commitment, Means of Implementation (MOI)[14], balance between mitigation and adaption and transparency in action and support in the new agreement. Under Workstream 2, discussion focused on issues such as initiatives to increase ambition and means of implementation to increase ambition.

The Doha Climate Gateway set out a timetable for the 2015 Agreement, streamlined the negotiations in focus of the new agreement, acknowledged the need for both ambitious mitigation activities and increased adaptation measures and launched a new commitment for the developed countries under the Kyoto Protocol for the period 2013-2020[15].

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[14] *Means of implementation include finance, technology development and transfer, and capacity building.*

[15] *See UNFCCC (2016f) The Doha Climate Gateway. URL: http://unfccc.int/key_steps/doha_climate_gateway/items/7389.php*

In COP 19 in Warsaw, Parties decided to prepare the draft of the new climate agreement by December 2014 and finalise it by May 2015. They emphasised the role of national-level activities and agreed to launch domestic preparations for putting forward their commitments by the end of 2014. They also decided to accelerate mitigation actions until 2020, to improve the transparency of long-term climate financing, to establish the Warsaw Framework for REDD+ and the Warsaw International Mechanism for Loss and Damage, to support developing countries especially affected by the impacts of climate change. A major milestone of the negotiation process reached in the final minutes of the ADP plenary at COP19 (IISD, 2013) was a change in the Parties' mitigation pledges – from nationally determined mitigation commitments, a term that had been used in previous negotiations and in Parties' submissions to the ADP in 2013 – to intended nationally determined commitments (INDCs).

In **2014 at COP20 in Lima**, then IPCC Chair Rajendra Pachauri provided negotiators with a timely reminder from the IPCC's Fifth Assessment Report (AR5) on GHG emissions in which he stressed that the goal to remain below the 2°C target will require that GHG emissions decline by 40-70% by 2050, relative to 2010 levels, and reach zero or negative levels by 2100. Under the ADP, Parties worked on a non-paper on elements for a draft negotiating text and a single draft decision on advancing the Durban Platform for enhanced action put forward by the co-chairs. The information and processes required for submission of INDC featured prominently in the negotiating of the draft decision. The issues on differentiation, means of implementation and inclusion of terms "evolving responsibilities" and "parties in a position to do so", and loss and damage remained unresolved through the negotiation sessions on the draft decision and negotiating text.

In addition to the adoption of the 37-page draft text of the Paris Agreement[16], the major outcome was the Lima Call for Climate Action[17]. A key feature in the Lima Call for Climate Action was that it reflected consensus in dealing with adaptation. The COP affirmed its determination to strengthen adaptation action through the protocol, another legal instrument or agreed outcome with legal force under the Convention to be adopted at COP21 and urged developed country parties to provide and mobilise enhanced financial support to developing country parties for ambitious mitigation and adaptation actions.

The 37-page Lima text grew to a 90-page document at the conclusion of the intersessional negotiation session held in Geneva, Switzerland in February 2015[18]. Through the hard work and dedication of Parties and facilitators in consolidating and streamlining the Geneva Text during the subsequent 3 negotiating sessions in Bonn, Germany, the final draft agreement text and COP decision text were completed on 23 October 2015[19].

The **Paris Climate Change Conference** convened from 29 November to 13 December 2015 in Paris, France, and was attended by over 23,100 government officials and 9,400 representatives from UN bodies and agencies, intergovernmental organisations and civil society organisations (IISD, 2015). World leaders attended an event on 28 November to demonstrate support for a successful global climate agreement.

Negotiations on the key areas of the agreement text such as mitigation, adaptation, loss and damage, finance, technology development and transfer, capacity building, transparency, global stocktake and compliance and associated COP decisions were organized through spin-off groups. Facilitators for each spin-off group reported to an ADP contact group each morning on the progress made. Parties were able

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[16] *See ADP 2-7 agenda item 3. Elements for a draft negotiating text. Version 2 of 10 December 2014 at 06:30. URL: https://unfccc.int/files/meetings/lima_dec_2014/in-session/application/pdf/adp2-7_3_10dec2014t_np.pdf*

[17] *See UNFCCC (2014) Decision 1/CP.20, Lima Call for Climate Action, UN Doc. FCCC/CP/2014/10.Add.1. URL: http://unfccc.int/resource/docs/2014/cop20/eng/10a01.pdf#page=2*

[18] *See UNFCCC (2015) Work of the Contact Group on Item 3: Negotiating text, Advance unedited version 12 February 2015.*

[19] *See UNFCCC (2015b) Draft agreement and draft decision on workstreams 1 and 2 of the Ad Hoc Working Group on the Durban Platform for Enhanced Action, Work of the ADP contact group. Edited version of 6 November 2015, UN Doc. ADP.2015.11.InformalNote.*

to reduce and to some extent resolve gaps in their positions and adopt draft ADP draft conclusions which included the draft agreement and decisions on Workstream 1 and Workstream 2 by 5 December 2015.

On the evening of 5 December, the ADP draft agreement and associated decisions were presented to COP21. Parties agreed on the mode of work and the formation of Comité de Paris, an open-ended group, presided over by the COP21 President, to reach compromise on the draft text. Four informal ministerial consultations, referred to as indabas, were formed under the Comité de Paris to address key areas of the agreement, namely: support, facilitated by Emmanuel Issoze-Ngondet (Gabon) and Jochen Flasbarth (Germany); differentiation in the context of mitigation, transparency and finance, including pre-2020 finance, facilitated by Izabella Teixeira (Brazil) and Vivian Balakrishnan (Singapore); and ambition, long-term objectives and periodic review, facilitated by Pa Ousman (The Gambia) and Amber Rudd (UK). On 7 December, additional indabas on: adaptation, and loss and damage, led by René Orellana (Bolivia) and Åsa Romson (Sweden); cooperative approaches and mechanisms, led by Catherine McKenna (Canada) and Raymond Tshibanda N'Tungamulongo (Democratic Republic of the Congo); and forests, led by Daniel Vicente Ortega Pacheco (Ecuador), Doris Leuthard (Switzerland) and Henri Djombo (Republic of the Congo).

Eventually, Parties were able to find convergence and the Paris Agreement and associated COP21 decision was adopted by the COP on 12 December 2015. Under Decision 1/CP.21, the COP has established the Ad Hoc Working Group on the Paris Agreement (APA) to prepare for the entry into force of the Agreement and to oversee the implementation of the work programme resulting from the relevant requests contained in the decision. Under Article 16, the COP will serve as the meeting of the Parties to the Paris Agreement. Parties to the Convention that are not Parties to Paris Agreement may participate as observers in the proceedings of any session of the Conference of the Parties serving as the meeting of the Parties to this Agreement (CMA) but shall not take any decisions.

THE ROLE OF PARTY GROUPINGS IN THE CLIMATE NEGOTIATIONS

In this subchapter we provide an introduction to major negotiation and regional interest groupings at the UNFCCC negotiations as well as giving an overview of the climate co-operation among the ASEAN countries.

Groupings in the Climate Change Negotiation Process

While Parties to the Convention and the Kyoto Protocol are typically represented by their respective national delegations comprised of officials representing and negotiating on behalf of their government, Parties can also choose to group and organise themselves regionally or by interest.

Under the United Nations, Parties are organized into 5 regional groups, mainly for the purpose of electing the Bureau, namely: African States, Asian States, Eastern European States, Latin American and the Caribbean States, and the Western European and Other States[20] (UNFCCC website).

Parties have organised themselves in other groupings which can be issue-specific, institutionalised or political to present substantive interests including their own. These groups can effectively promote the viewpoint of member countries as well as play a major role in building consensus at the negotiations. Coalitions can also help give voice to points of views that might otherwise be overshadowed or neglected. The membership is not exclusive and one country can be a member of more than one group.

Overview of negotiating coalitions

Over the last 2 decades of the climate negotiations, several significant groups have been established to represent common interest of its members (UNEP, 2007). Major coalitions include:

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[20] *The "Other States" include Australia, Canada, Iceland, New Zealand, Norway, Switzerland and the United States of America, but not Japan, which is in the Asian Group.*

- **Group of 77 and China (G-77 and China):** As the largest coalition in the UN, it provides a platform for 133 developing countries. The group meets before the regular UN sessions at ministerial meetings and agrees on the viewpoints to be represented. Many of its member countries also take part in other, smaller coalitions, such as the African Group, Alliance of Small Island States (AOSIS) or the group of LDCs.
- **European Union (EU):** As a regional political and economic organisation, the EU consists of 28 Member States (MS) from Europe. As well as its MSs, the EU itself is a party to the Convention, although without voting rights. During the negotiations, the EU is responsible for representing the interest and common position of its MSs as well as for ratification of new international agreements.
- **Environmental Integrity Group (EIG):** It includes Mexico, the Republic of Korea and Switzerland and the mini-states of Lichtenstein and Monaco and is operational since 2000.
- **African Group:** It includes 53 countries from Africa. The group is diverse as it includes more developed countries, oil-exporters as well as many of the LDCs. Therefore their negotiation interest may differ considerably. In recent years the Group has become more effective and proactive and it has advocated for financing developing countries and for preparing a legally-binding agreement by 2020.
- **Alliance of Small Island States (AOSIS):** A coalition of 44 low-lying coastal states and small island countries, representing approximately 5% of the global population. These countries are in different parts of the world but all face similar environmental, geographic, social and economic challenges. They are all vulnerable to sea-level rise. An ad-hoc lobbying group, it is represented at the negotiations by the chairperson or the vice-chairperson.
- **Least Developed Countries (LDCs):** The group includes those countries that are defined by the UN system as least developed states with low-income and weak human and economic capital. Many of the LDC countries are especially vulnerable to climate change, but lack resources for adequate adaptation activities. Currently there are 48 countries in the group with more than half from Africa and the rest from Asian countries or Small Island Developing States (SIDS).
- **Umbrella Group:** A loose coalition consisting of the non-EU developed countries, including usually Australia, Canada, Iceland, Japan, New Zealand, Norway, the Russian Federation, Ukraine and the US. The members also frequently speak individually, but in their joint statements they usually promote the view that developing countries should also adopt legally-binding commitments.
- **Like-Minded Developing Countries on Climate Change (LMDC):** the group was established in 2012 by China, Ecuador, Egypt, India, Malaysia, Nicaragua, Pakistan, the Philippines[21], Saudi Arabia, Thailand and Venezuela. Since then other G77 and China group members have also joined the group and now it has approximately 20 members.
- **High Ambition Coalition:** This coalition was the master plan of Europe and its allies conceived over the course of 2015. EU Climate Action and Energy Commissioner, Miguel Arias Cañete, led the outreach efforts, building a broad coalition of developed and developing countries in favour of high ambition that shaped the successful outcome of the Paris conference.

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[21] *The Philippines government announced its departure from the LMDC at a press conference at the Lima COP20 in 2014, reportedly wanting more flexibility in its negotiating positions. See Bello, W., 'The Dilemmas Faced by Climate-Vulnerable Developing Countries', Counter Punch, 20 January 2015. URL: http://www.counterpunch.org/2015/01/20/the-dilemmas-faced-by-climate-vulnerable-developing-countries/. See also Pearce, R., 'Infographic: Mapping country alliances at the international climate talks', 10 December 2014, Carbon Brief. URL: http://www.carbonbrief.org/infographic-mapping-country-alliances-at-the-international-climate-talks*

In addition to major party groupings, there are also several regional and other interest groups, which act on a more ad-hoc basis. These do not necessarily form official negotiation groups but they may issue joint statements, promote common interests and support each other's views.

Box 4: Other regional interests groups at the negotiations

AILAC: Independent Alliance of Latin America and the Caribbean

ASEAN: Association of Southeast Asian Nations

BASIC: Brazil, South Africa, India and China

BRIC: Brazil, Russia, India and China

CACAM Group: Countries from Central Asia and Caucasus, Albania and Moldova

GRULAC: Countries from Latin America and the Caribbean, including many Middle Income Countries and vulnerable SIDS

League of Arab States: Regional organization of North African and Middle Eastern Arab countries

OPEC: Organization of Petroleum Exporting Countries[22]

Intergovernmental Agency of the Francophonie: French-speaking countries

Source: UNFCCC website and UNEP, 2007

Besides the UNFCCC party groupings, a variety of joint climate initiatives have been formed, bringing together countries with similar climate interests and objectives (Widerberg and Stenson, 2013). Although these are more flexible mechanisms, which operate on a voluntary basis, they may contribute to the development of the 2015 agreement by setting examples for ambitious commitments and actions and by creating an enabling environment at the national level.

Table 1: Examples of climate initiatives outside the UNFCCC

Type of co-operation	Initiatives
Country co-operations	G7/G8
	G20
	Asia-Pacific Economic Co-operation (APEC)
Energy partnerships	REN21
	Renewable Energy and Energy Efficiency Partnership (REEEP)
Emissions reduction partnerships	Climate and Clean Air Coalition (CCAC)
	Coalition for Rainforest Nations
	Carbon Sequestration Leadership Forum (CSLF)
	Global Methane Partnership
	International Partnership on Mitigation and Measurement Reporting and Verification (M-MRV)
	LEDS Global Partnership
	REDD+ Partnership

[22] *Including Qatar Indonesia, Libya, the United Arab Emirates, Algeria, Nigeria, Ecuador, Gabon and Angola.*

THE ROLE OF PARTY GROUPINGS

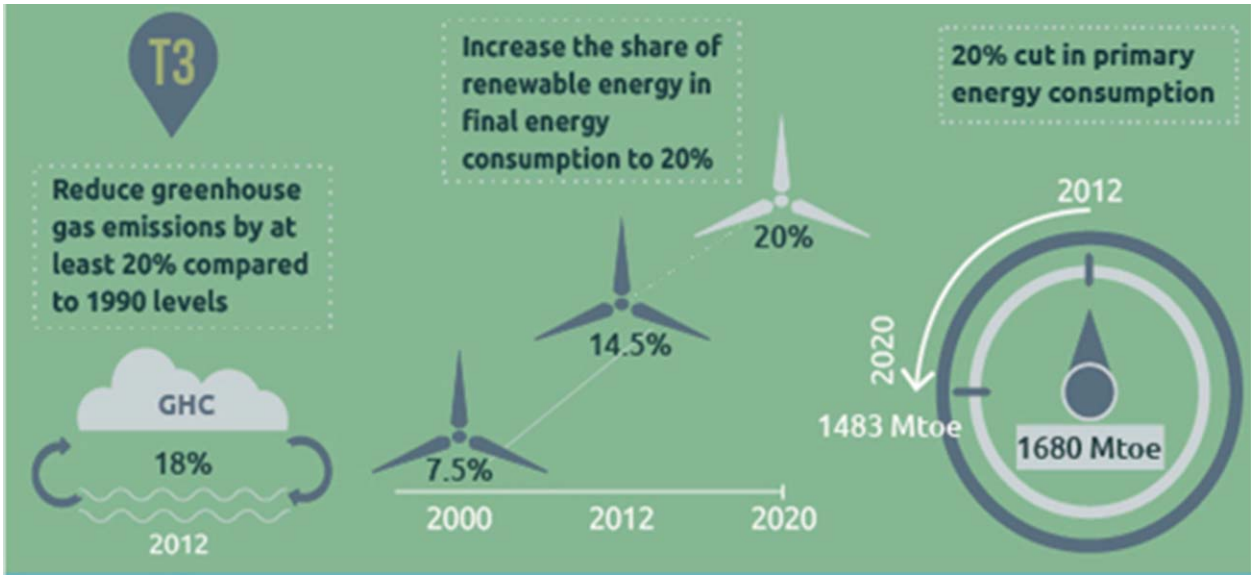
Over the last 2 decades many party groupings have been successful in working together on climate agreements. The EU has been traditionally effective in promoting its initiatives and often played a major role in moving the negotiations forward. The Environmental Integrity Group (EIG) ensured representation of its members at closed-door, smaller group negotiations on different occasions. The OPEC countries, although they have not formed an official bloc, often take a common standpoint in their national statements.

Box 5: The European Union, a regional climate co-operation

Representing its 28 Member States, the EU played an important role in the launch of the Kyoto Protocol by convincing other developed countries (i.e. Japan and Canada) to join the Protocol. Although the EU had failed at COP15 in Copenhagen to negotiate a new climate agreement, the MSs successfully lobbied for the launch of the second commitment period of the Kyoto Protocol in 2011 at COP17 in Durban (The Climate Group, 2011). Furthermore by building a coalition with over 100 developing countries, it also managed to pave the way and launch the preparations for the 2015 agreement (The Climate Group, 2011).

In addition, the EU as a regional grouping, can also serve as an example and inspire actions in other countries. A legally-binding[23] climate-energy package set 3 key emissions reduction and energy targets by 2020. These were also adopted by the Europe 2020 strategy for smart, sustainable and inclusive growth as headline targets.

Figure 10: The third target of the EU2020 strategy on climate change and energy



Source: www.dotinfographics.com/projects

[23] *Providing a longer-term vision, in 2011 the EU also adopted a Roadmap to a Competitive Low-Carbon Economy by 2050. In line with the EU roadmap, the MS were also called to develop their national low-carbon roadmaps. More recently, in 2013, the EU strategy on Adaptation to Climate Change was adopted. It aims to climate-proof the EU policies of vulnerable sectors and support the MS in developing national adaption strategies*

At the same time, other coalitions have had more difficulties in pursuing a common negotiation agenda. The G77 and China group includes a high number of diverse countries with considerable differences in levels of development and in economic interest. As a result, the members of the G-77 and China frequently intervene as individual countries in debates, representing their own interest in terms of climate actions. In addition, many countries of the G77 and China group have formed smaller coalitions (AOSIS, the LDC and the African group). Although struggling with capacity and budget constraints, in recent years, these smaller country coalitions have become more successful in promoting common interest. (UNEP, 2009 and UNFCCC website, 2016).

The importance of developing country coalitions is further amplified by the fact that developing countries often lack resources and capacities to effectively represent their negotiating interests. For example, especially if compared to developed countries, they often have a smaller delegation that makes it impossible for them to attend all parallel sessions or informal meetings or have a comprehensive negotiation team with a variety of important capacities, including politicians, scientists, lawyers, economists and diplomats (UNEP, 2009). By teaming up with like-minded countries and working together with NGOs, their representation can be more efficient at the negotiations.

Figure 11: World cloud of most used words in the LMDC submission on the 2015 agreement

Source: Duyck, 2013

The LDC group also outlines the responsibility of developed countries but in addition it advocates that all countries take climate actions. It also suggests the introduction of a strong compliance mechanism. The AOSIS, as a group of highly vulnerable countries to climate change, emphasises the historical responsibility and leadership role of developed countries.

Figure 12: World cloud of most used words in the LDC and AOSIS submission on the 2015 agreement

Source: Duyck, 2013

The **EIG** advocates that all countries make mitigation commitments according to their capacity levels. It also promotes adoption of obligatory targets. The **Independent Alliance of Latin America and the Caribbean (AILAC)**[24] also advocates that all countries make mitigation commitments. Countries in need can receive support to finance their adaptation activities.

[24] *Including Chile, Colombia, Costa Rica, Guatemala, Panama and Peru*

3. THE PARIS AGREEMENT: WHAT WAS ACTUALLY ACHIEVED AT THE COP21 SUMMIT?

On 12 December 2015, 196 Parties (195 countries and the European Union) came together and agreed to the terms of the Paris Agreement, a landmark conclusion to more than 20 years of international climate diplomacy in which all Parties will contribute towards addressing the challenges of global climate change. The Agreement is expected to come into force in 2020 and will succeed Commitment Period 2 of the Kyoto Protocol.

The Agreement reflects a delicate balance between the vastly differing negotiating positions and agendas of 195 countries in crucial areas such as: mitigation, transparency, adaptation, loss and damage, support including finance, technology development and transfer, and capacity-building, as well as the ever-present cross-cutting issue of differentiation. Under the Agreement, all countries will take action in the form of Intended Nationally Determined Contributions (INDCs) to reduce GHG emissions and will be legally bound to report on their progress and account for their mitigation actions (Baker & McKenzie, 2016).

While most countries felt that they had to concede on certain issues, the outcome from Paris seems to have exceeded almost everyone's expectations. World leaders and the press applauded the Agreement as "a major leap for mankind", and "a turning point for the world"[25]. The European Union called it "an ambitious and balanced agreement."[26] At the end of the day, the Ad hoc Working Group on the Durban Platform for Enhanced Action (ADP) delivered – as mandated – an Agreement "applicable to all Parties" and this itself must be considered a significant achievement. The Washington Post noted that "… The Paris Agreement is a landmark in the world's response to manmade climate change, with every nation that matters acknowledging the problem and pledging to respond… Opponents, including many in Congress, can no longer claim that action is pointless because big emitters such as China will never cooperate".[27]

However, there were also several mixed and cautionary views about the success of the Agreement. These views mostly noted that there is lack of clarity in actions, for example, in key issues such as mitigation and support and that many of the details have been moved out of the binding Agreement and into the more flexible Conference of Parties (COP) decisions (See Figure 8). It was noted that the text is vague on the overall ambition as it does not specify a date for the peaking of emissions, and specifies only that reductions should lead towards "greenhouse gas emissions neutrality" in the "second half of the century". As a result, the Agreement's overall impact on global climate change will be contingent on its implementation.

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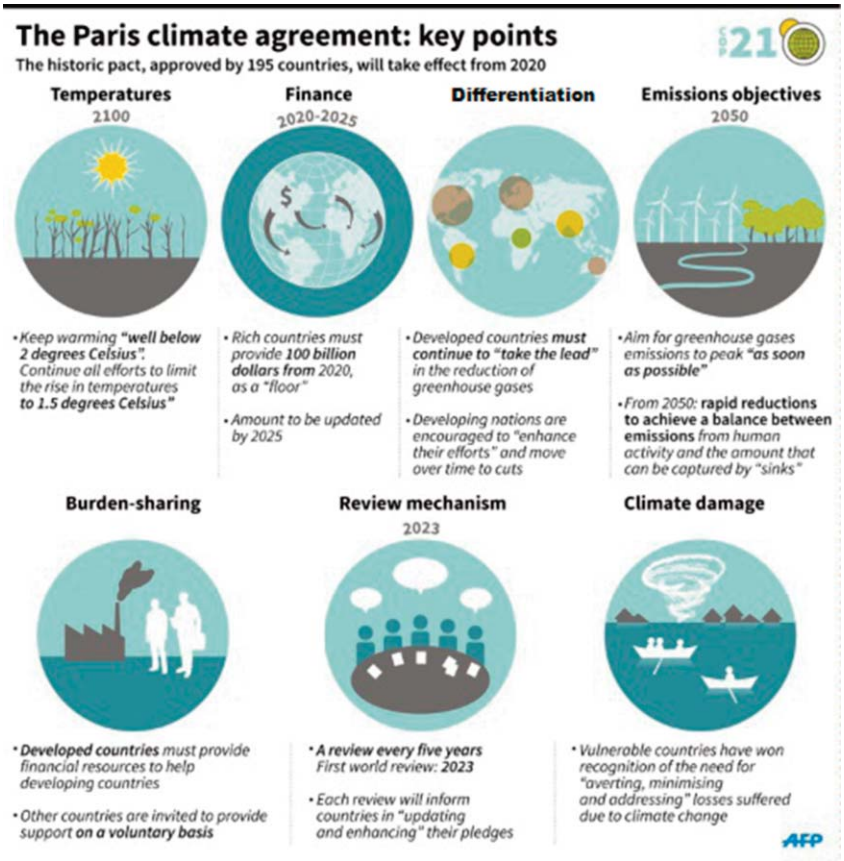
[25] *See Gosden E. (2015) "Paris climate agreement 'a major leap for mankind'", The Telegraph, 12 December 2015.*

[26] *See European Commission (2015) "Historic climate deal in Paris: EU leads global efforts", Press Release, 12 December 2015.*

[27] *See The Washington Post (2015) "With the Paris climate pact, critics now have no basis to say action is pointless", The Washington Post, 12 December 2015.*

Figure 13: Key points from the Paris Agreement



Source: Adapted from Woodard (2015)

In this chapter an analysis of the key articles of the Paris Agreement and their corresponding decisions in the COP 21 Decision Text are presented.

OBJECTIVE OF THE AGREEMENT AND LONG-TERM GOAL

Paris Agreement - Articles 2.1, 4.1, 4.3, 4.4, 4.5
Decision 1/CP.21 - Paras 23, 24

The Agreement sets a "long-term temperature goal" of limiting global climate change by holding the increase in global temperature to 2 °C above pre-industrial levels and, if possible, to further restrict the temperature increase to 1.5ºC; while keeping in context the objectives of sustainable development and eradication of poverty.

The 2 °C target was first agreed upon at COP16 in Cancun. However, the Small Island Developing States (SIDS) have since argued that even a temperature rise of 2 °C is enough to threaten the survival of some of their member states. Thus, at the Paris negotiations, agreement was reached on including the 1.5 °C as an ambitious effort, which Parties would nevertheless continue taking efforts to achieve.

The Agreement's objectives also include enabling countries to move to a low emission development trajectory while ensuring that food production is not threatened. This is in line with the original objectives of the Convention.

MITIGATION AND GLOBAL STOCKTAKE

Paris Agreement – Articles 4.2, 4.3, 4.4, 4.9, 4.13, 5.1
Decision 1/CP.21 – Paragraphs 22-40

In order to achieve the objective and long-term goals of the Agreement, Parties will need to submit their first pledge, known as a "Nationally Determined Contribution" (NDC), no later than when the Party submits its instrument of ratification, accession, or approval of the Agreement before 2020. The countries that submit their pledges in the form of an Intended Nationally Determined Contribution (INDC)[28] prior to joining the Agreement are deemed to have satisfied this requirement and need not re-submit one in the form of an NDC.

Building on the foundation of these submitted pledges, all Parties are to submit "successive" NDCs in 2025 and every five years thereafter. These will have to represent a progression beyond the Party's current emissions reduction pledge reflecting its highest possible ambition.

The initial and successive NDCs will reflect Parties' common but differentiated responsibilities and respective capabilities (CBDR-RC), in light of different national circumstances. The Agreement takes into consideration differentiated responsibilities and capabilities of Parties through acknowledgement in Article 4 of the special circumstances of Least Developed Countries (LDCs) and SIDS. Throughout the text, there is a call for support to be provided to developing countries and for developed country Parties to continue take the lead in economy-wide absolute emission reductions.

This differentiating mechanism is counterweighed by a strong process that is established for countries to assess implementation and take stock of collective climate actions every 5 years. The "Global Stocktake" will convene in 2023, but before that countries will undertake a facilitative dialogue in 2018 to take stock of the Parties' efforts in relation to the "long-term goal" of the Agreement. The dialogue is expected to inform preparation of new NDCs that go beyond 2025 for countries such as the US and Switzerland, which submitted targets only up till then. It is also expected to encourage countries that have 2030 targets in their INDCs to update their NDCs before the Agreement comes into force.

FORESTRY

Paris Agreement – Preamble, Articles 4.1, 5, 13.7(a)

Parties to the UNFCCC have been negotiating a mechanism to reduce emissions from forest degradation and to enhance forest stocks since COP11 in 2005 (Wuppertal Institute for Climate, Environment and Energy, 2016). In 2013, the Warsaw Framework for REDD+ (Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries) was adopted, which contained 7 decisions on various aspects of REDD+ including result-based finance and monitoring, reporting and verification (MRV) systems (UNFCCC, 2016b).

Thus, for the Paris negotiations, the main issue being debated was whether REDD+ would be explicitly mentioned in the Agreement or whether a more general reference to forestry-based activities and mechanisms would be preferred. In addition, proposals being considered included setting up non-market approaches such as the Joint Mitigation and Adaptation Mechanism (JMA) for implementing forest protection activities.

Building upon the Warsaw Framework, Parties are encouraged to implement and support forestry related mitigation activities through both market and non-market approaches. In addition, the Decision

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[28] *The term INDCs was agreed upon by Parties only in the final minutes of the ADP closing plenary at COP 19 in Warsaw, Poland in November 2013. Parties agreed to use the word "intended" together with "nationally determined contributions" so as to reflect consensus and signal a "bottom up" approach to encouraging universal participation of the Paris Agreement.*

Text also recognises that finance needs to be made available for result-based payments for REDD+ activities as well as for JMA approaches, and that such finance may come from public, private, bilateral, or multilateral sources including the GCF.

COOPERATIVE APPROACHES

Paris Agreement - Article 6 (1-9)
Decision 1/CP.21 - Paragraphs 36-40

The most practical approach towards reducing emissions is to achieve them in an economically efficient manner, i.e. focus on cost-efficient emission reduction plans/strategies. Thus, emissions reduction measures that have negative or smaller payback periods must be targeted first, before utilising more expensive measures. For some Parties, such low cost emission reduction measures may have been exhausted and additional measures may be economically prohibitive, or may not even be technologically sound.

Thus, to enable Parties to achieve the objectives stated in their INDCs and to allow them to achieve even higher ambition targets, the section on Cooperative Approaches recognises that Parties may engage in any form of voluntary cooperation amongst themselves, such as through carbon markets. Parties may also engage in bilateral transfer of emissions reductions, as Internationally Transferred Mitigation Outcomes (ITMOs), from one Party to the other and use these credits towards the objectives of their INDCs.

At first thought, this mechanism seems similar to the Clean Development Mechanism (CDM) and the Joint Implementation (JI) Mechanism that were created as part of the Kyoto Protocol's flexibility mechanisms. However, there are key differences – firstly, the mechanism does not restrict cooperation to between developed and developing country parties. Thus, it theoretically opens up possibilities of South-South carbon financing. Furthermore, it is not restricted to only project-based emissions reduction activities; rather, such approaches may now focus on quantifying bulk emissions reductions from implementing sectoral level policies and programmes. Finally, it is clear that the mechanism must *"...deliver an overall mitigation in global emissions"* which is different from the zero-sum principle followed by the Kyoto mechanisms.[29]

During the implementation of the CDM and JI, a number of issues were encountered, such as whether the projects and resultant emissions reductions were truly "additional" or not. The accompanying decision text thus places the onus on the Subsidiary Body on Scientific and Technological Advice (SBSTA) to develop rules, modalities and procedures that utilise the experience gained from CDM and JI to ensure that the emissions reductions are Additional[30]. The rules, modalities and procedures will also ensure that emissions reductions generated are not double counted, i.e. the ITMOs cannot be used by the Party hosting the emission reduction activity towards its NDC, if they are counted by the other Party towards its own NDC objectives. The mechanism will function under the authority of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA), which will setup a new body to supervise its functioning.

A framework for non-market approaches as a form of cooperation will also be developed. However, for now, there is no mention of any other details except for the high level objectives of the framework - i.e. creating synergy between mitigation, adaptation, technology transfer, etc. The responsibility for developing a work programme for implementing non-market approaches has been allotted to the SBSTA[31].

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[29] *UNFCCC (2016) Decision 1/CP.21, Adoption of the Paris Agreement, UN Doc. FCCC/CP/2015/10/Add.1, 29 January 2016, Annex, Article 6.4(d).*

[30] *Ibid, para. 38.*

[31] *Ibid, para. 40.*

ADAPTATION

Paris Agreement - Article 7
Decision 1/CP.21 - Paragraphs 41-46

Developing countries particularly the LDCs[32] and SIDS[33] have been urging at COP meetings and inter-sessional meetings and in their submissions to the ADP, that adaptation should form a crucial element of the Paris Agreement; and to address enhanced action and scaling up of funding from developed countries to support adaptation. Interventions during the Paris negotiations called for adaptation's link with mitigation to be maintained and continue to be based on the principles of CBDR-RC.

As part of the Agreement, Adaptation is recognised as a global challenge and a key component to the long-term goal to protect people, livelihoods and ecosystems, and taking into account the urgent and immediate needs of those developing countries that are particularly vulnerable. Parties should strengthen their cooperation on enhancing action on adaptation and take into account the Cancun Adaptation Framework.[34]

Each Party shall, as appropriate, engage in adaptation planning processes, and implementation of actions, including the development of relevant plans, policies and/or contributions. Parties should submit and update periodically an adaptation communication. Continuous and enhanced international support shall be provided to developing countries. The Global Stocktake shall include progress, implementation and support for adaptation.

LOSS AND DAMAGE

Paris Agreement - Article 8
Decision 1/CP.21 - Paragraphs 47-51

Loss and damage associated with climate change was first proposed at the intersessional meeting in Bonn, Germany in May 2012 when the Alliance of Small Island States (AOSIS) called for the establishment of such a mechanism under the new agreement[35]. It has long been a contentious and controversial issue between the developing and developed countries.

While developing countries, especially the LDCs and the SIDS, have been demanding the establishment of an institutional mechanism to address loss and damage, developed countries have opposed the establishment of this mechanism arguing that loss and damage could be addressed under the existing framework of mitigation and adaptation. Developed countries are in favour of technical and financial support for loss and damage to developing counties, but remain steadfastly opposed to liability and compensation associated with such a mechanism. As a result, the only major achievement till date on this issue was the establishment of the Warsaw International Mechanism for Loss and Damage (WIM) agreed at COP19 in Warsaw, Poland.

In Paris, Parties were unable to resolve this issue well into the end stages of the negotiations. Eventually, the Comité de Paris was able to find convergence of views and a separate article on loss and damage was agreed. Under Article 8, Parties recognise the importance of averting, minimising and addressing loss and damage associated with the adverse effects of climate change. The WIM is to operate under the authority and guidance of the CMA and may be enhanced and strengthened, as determined by the CMA.

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[32] *Cambodia, Lao PDR and Myanmar are recognised as LDCs.*

[33] *Singapore is a member of the SIDS.*

[34] *The Cancun Adaptation Framework was adopted by Parties as part of the Cancun Agreements from COP 16 held in Mexico in 2010. Its objective is to increase international cooperation to support adaptation action in developing countries taking into account the needs of those that are particularly vulnerable. For more details, see http://unfccc.int/adaptation/items/5852.php/.*

[35] *See Alliance of Small Island States (AOSIS) proposal to the AWG-LCA: Multi-window Mechanism to Address Loss and Damage from Climate Change Impacts, 6 December 2008. URL: http://unfccc.int/files/kyoto_protocol/application/pdf/aosisinsurance061208.pdf*

The article also lists eight areas of cooperation and facilitation to enhance understanding, action and support on loss and damage. While the Paris Agreement does recognise loss and damage as a separate issue from adaptation, it does not establish a new mechanism as called for by developing countries. There is no reference to liability and compensation from loss and damage in the Agreement, but the issue is clearly addressed in Paragraph 51 of the decision text which states that the Conference of the Parties *"Agrees that Article 8 of the Agreement does not involve or provide a basis for any liability or compensation"*, an outcome in line with the stance of the developed countries.[36]

FINANCE

Paris Agreement - Article 9
Decision 1/CP.21 - Paragraphs 52-64, 114

Developing countries have long demanded that developed countries must provide significant amounts of climate finance if they expect developing countries to achieve ambitious emissions reductions. Analysis by one independent think-tank suggests that as of 23 October 2015, developing countries have requested USD 3,534 billion to implement their INDCs, including a demand for USD 2.5 trillion by India (Carbon Brief, 2016).

In Paris, attempts to reach agreement on finance clauses proved to be extremely difficult. While developing country Parties demanded that developed country Parties provide a clear roadmap for achieving the promised finance levels by 2020, developed country Parties instead wanted the burden to be shared amongst *"all Parties in a position to do so"*.[37]

Under the Paris Agreement, developed country Parties are now mandated to provide finance to developing country Parties for both mitigation and adaptation activities. At the same time Parties other than the developing country parties are also encouraged to voluntarily contribute towards financial support. In addition, finance mobilised must be balanced between mitigation and adaptation, rather than the mitigation-centric nature of climate finance today.

Furthermore, developed countries must take the lead in mobilising climate finance from a variety of sources and focus on public finance. While the agreement text contains no references to the quantity of climate finance that is targeted for mobilisation; it does mention that the mobilization should represent a progression of funds mobilised. Instead, this information is codified in the Decision Text which states that developed countries will continue to mobilize USD 100 billion through 2025, after which a new collective quantified goal will be set with USD 100 billion as a floor[38]. The Decision Text also urges the developed countries to prepare a concrete roadmap towards achieving their goal of providing USD 100 billion annually by 2020.[39]

There are also provisions for greater transparency regarding the provision of finance. Developed country Parties must biennially report qualitative and quantitative information regarding finance mobilized collectively and on financial resources provided to developing countries, as part of their overall reporting requirements as agreed under the section on Transparency. In addition, there are also special requirements to provide information on public financial resources provided to developing countries and on finance mobilised *"through public interventions"*.[40]

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[36] *UNFCCC (2016) Decision 1/CP.21, Adoption of the Paris Agreement, UN Doc. FCCC/CP/2015/10/Add.1, 29 January 2016, Annex, para. 51.*

[37] *See Draft agreement and draft decision on workstreams 1 and 2 of the Ad Hoc Working Group on the Durban Platform for Enhanced Action: Edited version of 6 November 2015, Article 6. URL: http://unfccc.int/resource/docs/2015/adp2/eng/11infnot.pdf*

[38] *UNFCCC (2016) Decision 1/CP.21, Adoption of the Paris Agreement, UN Doc. FCCC/CP/2015/10/Add.1, 29 January 2016, para. 54.*

[39] *Ibid, para. 115.*

[40] *Ibid, para. 51 and Annex, Article 9, para 7.*

The special inclusion of language on public finance is possibly the result of an intense debate between developed and developing countries on what constitutes climate finance; with developing countries often complaining that developed countries simply re-package already promised financial assistance as climate finance, thus there being very little real, additional financial flow for climate action. As a result, the SBSTA has been tasked with development of modalities for developed country Parties to demonstrate transparency on how the financial resources have been mobilised.[41]

TECHNOLOGY TRANSFER

Paris Agreement - Article 9
Decision 1/CP.21 - Paragraphs 65-70

The Paris Agreement notes the importance of enabling technology transfer towards achieving higher ambition outcomes for both mitigation and building resilience. Thus, in continuation with the work of the UNFCCC's Technology Mechanism, a technology framework is established to provide guidance to the technology mechanism, which will now also serve the Paris Agreement. The Decision Text defines certain key objectives of the technology framework and delegates further elaboration of the framework to the SBSTA.[42]

The Financial Mechanism of the Agreement will play an important role in funding research and development and enabling access to technology for developing countries. Thus, it also mandates support, including financial support to be provided to developing countries to enable them to cooperate on technology development and transfer. Adequacy of technology transfer and development will be assessed in the Global Stocktake to be done every 5 years beginning in 2023.

CAPACITY BUILDING

Paris Agreement - Article 11
Decision 1/CP.21 - Paragraphs 71-83

Article 11 of the Agreement recognises that capacity building plays a crucial role in enhancing the ability of developing countries, especially the LDCs and SIDS to not only implement mitigation and adaptation measures, but also access finance and technology transfer from the relevant institutions. In order to ensure that capacity building continues to contribute effectively and further enhance capacity building efforts, the Decision Text establishes the Paris Committee on Capacity Building.

The key objectives to be covered under the 2016-2020 work plan for the Committee are also outlined, including identifying capacity gaps and needs, developing tools for implementation of capacity building, and identifying synergies with capacity building efforts of other institutions within and outside the climate change institutional framework. Furthermore, an assessment of the effectiveness and enhancement of this committee, including whether it should be extended, will be carried out in 2019.

All Parties engaging in capacity building efforts for developing countries will also report on their efforts and developing countries are required to report on their implementation of capacity building policies and measures.

TRANSPARENCY OF ACTION AND SUPPORT

Paris Agreement - Article 13
Decision 1/CP.21 - Paragraphs 84-98

Transparency is at the core of the Paris Agreement, since it contains requirements for Parties to disclose information on progress made towards fulfilling the objectives outlined in their NDCs. Thus, all Parties need to provide information on:

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[41] *Ibid, para. 57.*

[42] *Ibid, para. 67-8.*

- National greenhouse gas inventories prepared by using IPCC guidelines;
- Mitigation and adaptation actions towards the overall objectives of their NDCs; and
- Support provided (by developed country Parties and others who voluntarily chose to do so) and received (by developing country Parties) – in financial, technology and capacity building terms

Except for the LDCs and SIDS, all Parties must submit this information at least once in 2 years. The submitted information will be subjected to a technical expert review which will review the consistency of the information provided with the requirements and will also identify areas of improvement. Parties will also participate in a facilitative, multilateral consideration of progress.

While the transparency framework will build on existing arrangements under the Convention, the modalities, procedures and guidelines of this transparency framework shall eventually supersede the current Measurement, Reporting and Verification (MRV) system.

The requirements of the transparency framework can place undue requirements, especially on developing countries. Thus in order to build institutional and technical capacity of developing countries, a "Capacity-building Initiative for Transparency" has been established. This initiative will support developing country Parties, upon request, in meeting enhanced transparency requirements as defined in Article 13 of the Agreement in a timely manner. The COP has requested the Global Environmental Facility (GEF) to support the operation of this initiative including through voluntary contributions.

The section on transparency is critical because while the Agreement is a legally binding instrument, it contains no specific language that mandates Parties to implement their respective (I)NDCs or achieve the objectives (action or support) spelled out in their pledges. The Agreement only states that countries must pursue domestic mitigation measures to achieve their set targets, and it places the responsibility on Parties to account for their respective NDCs. Thus, to ensure that Parties make every effort to achieve their specified targets, it is now mandatory for them to regularly report progress on their mitigation, adaptation, finance, technology transfer and capacity building pledges.

COMPLIANCE

Paris Agreement - Article 15
Decision 1/CP.21 - Paragraphs 102-103

The Paris Agreement is a legally binding agreement and will come into force in 2020 on condition that at least 55 Parties to the Convention accounting in total for at least an estimated 55% of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession. To facilitate the implementation and promote compliance with its provisions, a compliance mechanism is established. However, compliance is restricted to a facilitative, non-adversarial and non-punitive approach respecting the national capabilities and circumstances of the Parties. The mechanism will consist of a committee of 12 scientific, technical, socio-economic or legal experts who will attempt to understand the reasons for non-compliance and promote compliance through facilitative approaches such as through capacity building.

A climate deal with universal participation has to be based on reasonable assurance that there will be reciprocity of actions among Parties. It must also instil confidence in countries to implement their own. It would not have been politically feasible for Parties to agree on a solution that would subject them to consequences for non-compliance. Still, there has been significant progress made to enhance transparency in order to give "teeth" to the Agreement. The post-Paris agenda is likely to be packed with developing MRV guidelines before the Agreement comes into force in 2020.

AFTER PARIS - WHAT'S NEXT?

After more than 2 decades of negotiations since the UNFCCC was adopted in 1992, countries were finally able to negotiate a legally binding agreement that requires all countries to be involved in taking actions to reduce emissions. The Agreement thus reflects consensus amongst 195 countries on a lot of divisive areas such as mitigation, finance and overarching principles such as differentiation.

However, in order to achieve this consensus, the Agreement has had to essentially take the form of a skeletal framework that lays out the essential goals that needed to be agreed upon. To ensure that Parties collectively achieve these goals, a number of rules, modalities, procedures and guidelines will have to be negotiated in the coming years.[43] Most of these negotiations will be carried out at meetings of the APA, SBI, SBSTA and COP, starting with the May 2016 meeting in Bonn.

The following are key areas from the Paris Agreement for which implementation rules will have to be agreed upon:

- **Transparency:** The Paris Agreement does not legally bind Parties to achieve their INDCs, but it does legally require them to report on their progress towards their pledges. It is expected that this "name and shame" approach will play a key role in ensuring that Parties continuously strive to achieve their targets. Thus, all Parties except for the LDCs and SIDS will have to disclose required information in the form of a biennial communication. Towards this objective, the APA has been tasked to develop a MRV system by 2018 that will build upon and supersede the current MRV systems in place.
- **Finance:** One of the major demands from developing countries at the Paris negotiations was for developed countries to provide "new and additional" climate finance, especially from public finance sources. This demand stems from the debate on what constitutes climate finance and what doesn't. The Paris Agreement has thus, tasked the COP to initiate a process that will identify what information needs to be disclosed by developed countries in their biennial communications regarding finance that they have already provided and public funding that they intend to provide. Furthermore, the SBSTA will develop modalities for how developed countries will be able to account for financial resources leveraged through public interventions.
- **Carbon Markets:** The Agreement includes provisions for Parties to cooperate in achieving their INDC pledges – through both market and non-market approaches. However, it recognises that the use of market approaches must be undertaken in a manner that ensures overall environmental integrity and sustainable development. To ensure this objective is achieved, the SBSTA will develop guidance to avoid double counting of emission reductions by Parties that trade ITMOs, and will also develop rules, modalities and procedures to ensure that the emission reduction activities that result in ITMOs are "… additional to any that would otherwise occur".

The figure below lists other key additional tasks that will need to be completed before the first CMA.

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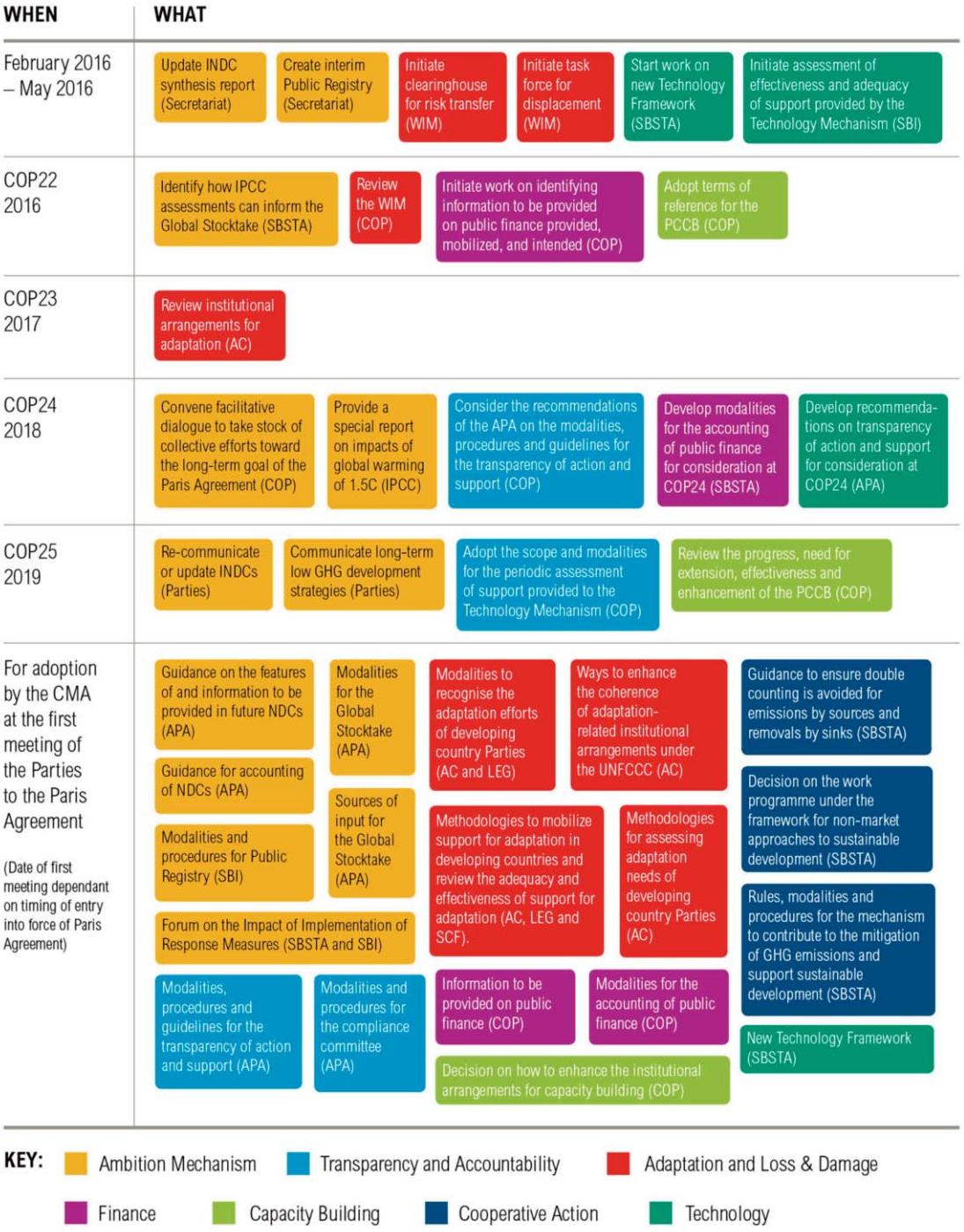
[43] *For a list of decisions from the COP21 decision text that require activities and tasks to be undertaken by various bodies. URL: http://unfccc.int/files/bodies/cop/application/pdf/overview_1cp21_tasks_.pdf. See also UNFCCC (2016g) Progress tracker: Work programme resulting from the relevant requests contained in decision 1/CP.21, 18 July 2016.*

URL: http://unfccc.int/files/paris_agreement/application/pdf/progress_tracker_180716_1530.pdf

Figure 14: Key tasks to be completed before the first Meeting of Parties to the Paris Agreement



Source: Northrop, E. and Krnjaic, M., 2016

PARIS AGREEMENT'S ENTRY INTO FORCE

On 4 October 2016, the Paris Agreement passed its double threshold for entry into force with ratification by 72 countries which account for more than 56% of global greenhouse gas emissions.

At a special "High-Level Event on Entry into Force of the Paris Agreement on Climate Change" on 21 September 2016 convened by UN Secretary-General Ban Ki-moon on the sidelines of the UN General Assembly, 31 countries including Brunei Darussalam, Singapore and Thailand formally joined the Paris

Agreement, moving the landmark deal closer to entry into force. Lao PDR had earlier deposited its instrument of ratification on 7 September 2016.

The agreement received a big boost earlier in the month when United States and China - the world's two largest emitters of greenhouse gases – ratified the agreement on the sidelines of the G20 Summit in Hangzhou. India, the world's fourth largest emitter of greenhouse gas (counting the EU as a single bloc) ratified the agreement on 2 October 2016, timed to coincide with the 147th birth anniversary of Mahatma Gandhi. The ratification move by major emitters and the global community to act on climate change is important as it significantly catalyses climate action around the world and demonstrates support of the countries that have joined the agreement.

While the rapid pace of ratification is unprecedented, the agreement's early entry into force was no easy feat. One of the climate leaders in the road to Paris, the European Union, which accounts for 12 per cent of global emissions, had taken longer than expected to ratify. At the time of the special event in New York, only three European states - France, Hungary and Austria - had passed domestic requirements for ratification but this itself does not constitute ratification. The EU member states had agreed that they would not submit their instruments of ratification until there is agreement on effort sharing within the bloc.

To this, President of the European Commission Jean-Claude Juncker had expressed embarrassment at the slow progress. A proposal for fast-track ratification was submitted in June for approval by the European Parliament and Council. Consent of European Parliament is required prior to the adoption of the decision by the Council. Only when approved can the Council will designate a representative to deposit the ratification instrument to the UN Secretary-General, on behalf of the EU. The major stumbling block here was that effort sharing between the EU member states in order to achieve their 40 per cent emissions reduction by 2030 compared to 1990 levels target had yet to be decided. Observers feared that lack of consent among the bloc's member states over their respective share to the EU-wide reduction target might delay the Paris pact until at least 2017.

However, the accelerated procedure paid off as the European Parliament voted on 4 October 2016 for the EU to ratify the agreement, stemming fears that late ratification would seriously put the EU's reputation as a climate leader at risk.

Other major emitters such as Japan and Canada are lagging behind. Japan has initiated its domestic process to ratify the agreement and its parliament kicked off an extraordinary session where necessary documents may be submitted. Canada is still in the midst of developing a national climate strategy on how the country is expected to meet its climate target before putting forward their instrument of ratification to the federal cabinet. Other major emitters such as the Russian Federation which accounts for 5 per cent of global emissions, Indonesia (4.3 per cent), Australia (1.48 per cent) or South Korea (1.4 per cent) have also yet to ratify the agreement.

Nevertheless, it is a remarkable achievement that the Paris Agreement will enter into force in 2016, given that it was adopted only 10 months ago. In contrast, the agreement's predecessor – the Kyoto Protocol – infamously took eight years to enter into force after being adopted in 1997. At the time, the US had refused to ratify the Protocol, citing that China and other major developing countries needed to play a role in addressing climate change as well.

The Agreement provides that it shall enter into force 30 days after 55 countries, representing 55 percent of global emissions, have deposited their instruments of ratification, acceptance or accession with the Secretary-General. As of today, 75 countries and the European Union have joined the Agreement, exceeding the 55 percent threshold for emissions. The first session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement, known in the climate jargon as CMA, will take place during the upcoming annual UN climate conference (COP22) in Marrakech. There, parties are expected to take stock of progress made by the subsidiary and constituted bodies in relation to their mandated work under the Paris Agreement and section III of decision 1/CP.21, in order to promote

and facilitate coordination and coherence in the implementation of the work programme, and, if appropriate, take action, which may include recommendations.

COP22 is scheduled to start in Morocco on 7 November, a day before elections in the US. Republican front runner Mr Donald Trump has rubbished the science of climate change, resulting in uncertainty over whether America – the world's second largest emitter of greenhouse gases – will hold up its end of the bargain going forward under a Trump administration. Legal expert Daniel Bodansky from the Sandra Day O'Connor College of Law points to a second important feature of early entry into force of the Paris Agreement.

If the Agreement enters into force before current US President Barack Obama leaves office then the next president would not be able to withdraw until sometime in 2019, and the withdrawal would not be effective until sometime in 2020. Once the agreement is in force, it would be politically much more difficult for Mr Trump, to back out of it. Indeed, backing out of an international agreement that the US previously entered into could be an unwise move, given the US' leadership role in tackling global challenges, as well as from a public relations standpoint. It will also stymie the growth of the multi-billion dollar clean tech industry in the US and the rest of the world. For businesses, the signal to go green is now clear. Private and public entities around the world are already moving to cut their greenhouse gas emissions.

Now that the Paris Agreement is on track to enter into force, the next important step would be for countries to work towards achieving the targets they have set. After all, when 190 countries had put forward their climate pledges for 2030 – known as nationally determined contributions – they are domestically accountable as well. Countries will need to continually ratchet up ambition according to science and pursue a low-carbon transition.

4. CLIMATE FINANCE

The UNFCCC and its Parties also recognise the importance of climate finance, and of providing financial assistance to developing countries, with fewer resources. Article 4.3 of the Convention commits developed countries under Annex II to "... provide new and additional financial resources to meet the agreed full cost incurred by developing country parties" required for meeting their reporting obligations under Article 12.1 of the Convention and to provide "... financial resources including for transfer of technology, needed by developing country Parties to meet the agreed full incremental costs of implementing measures..." covered under Article 4.1. In addition, Article 4.4 commits Annex II parties to help vulnerable developing countries in meeting their adaptation costs.

In this chapter we provide a general overview of the various climate financing sources including mechanisms of the UNFCCC and other multilateral and bilateral entities.

FINANCING MECHANISMS OF THE UNFCCC

The landscape of climate finance is rather complex, with a variety of funding sources and mechanisms. First, various financial mechanisms and funds operate directly under the Convention. These include:

- **Global Environment Facility (GEF):** As an international partnership, it serves as the financial mechanism for several environmental conventions, including the UNFCCC. The GEF finances mitigation and adaptation projects in developing countries and economies in transition, and aims to finance projects that offer win-win solutions for local economies (GEF, 2016). It reports to the COP and its activities are regularly reviewed. So far, the Fund has allocated a total of USD 910 million for various mitigation and adaptation objectives (GEF, 2016). The GEF manages to major funds concerning climate change:
    - *Least Developed Countries Fund (LDCF):* This was established to support the implementation of National Adaptation Programmes of Action (NAPAs) in Least Developed Countries (LDCs), which are especially vulnerable to climate change. NAPAs and the definition of priority areas for adaptation actions are developed via country-driven processes (UNFCCC, 2016).
    - *Special Climate Change Fund (SCCF):* This fund focuses on financing long- and short-term adaptation activities in various sectors, and promoting technology transfer in any developing countries, vulnerable to climate change. Priority areas include water resource management, agriculture, coastal zones, and natural resources (UNFCCC, 2016 and GEF, 2016).

Table 2: Availability of the LDCF and the SCCF for AMS

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
LDCF	No	Yes	No	Yes	No	Yes	No	No	No	No
SCCF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GEF Focal Points	N.A.	Ministry of Environment	U.S. Embassy of Indonesia and Ministry of Environment and Forestry	Water Resource and Environment Administration and Science Technology and Environment Agency	Ministry of Natural Resources and Environment and Prime Minister's Department Economics Planning Unit	Ministry of Environmental Conservation and Forestry	Permanent Mission of the Republic of the Philippines to the United Nations and Department of Environment and Natural Resources	N.A.	Ministry of Foreign Affairs and Ministry of Natural Resources and Environment	Ministry of Natural Resources and Environment

Source: GEF, 2016

- **Adaptation Fund:** This fund supports adaptation programmes and projects in developing countries that are Parties to the Kyoto Protocol. The Fund is financed from the CDM, by a 2% levy after each CER issued by the CDM. It was established in 2001 and is managed by the Adaptation Fund Board. The Adaptation Fund had received approximately USD 400 million as of June 2015, out of which approximately USD 100 million had been disbursed (Mansell, A., 2015).

Table 3: Availability of the Adaptation Fund for AMS

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Availability	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Country offices	N.A.	Ministry of Environment of the Kingdom of Cambodia	National Council on Climate Change	Directory of Climate Change Office Department of Environment	Ministry of Natural Resources and Environment	National Environment Conservation Committee (NECC)	Department of Environment and Natural Resources	N.A.	Ministry of Natural Resources and Environment	Ministry of Natural Resources and Environment

Source: Adaptation Fund, 2016

- **Green Climate Fund (GCF):** This fund was established at COP16 to serve as an operating body of the Convention's financial mechanism in the long term. The Fund is managed by the GCF Board, and as of February 2016, has raised USD 10.2 billion in pledges (GCF, 2016). It aims to support developing countries in their climate activities. To support this objective, developed countries pledged to provide USD 100 billion by 2020 via the GCF (UNFCCC, 2009).

Table 4: Availability of the Green Climate Fund for AMS

	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Availability	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
National Designated Authority (NDA) and focal point	No	Ministry of Environment	Fiscal Policy Agency, Ministry of Finance	Ministry of Natural Resources and Environment	Ministry of Natural Resources and Environment	Ministry of Environmental Conservation and Forestry	Climate Change Commission	National Climate Change Secretariat	Office of Natural Resources and Environmental Policy and Planning	Ministry of Planning and Investment

Source: Green Climate Fund, 2016

Table 5: Further information on the use of the funds

Name	Type	Scope	Project examples	Application Information
LDCF	Adaptation	NAPA implementation in LDCs	o Cambodia: Strengthening Climate Information and Early Warning Systems in Cambodia to Support Climate Resilient Development and Adaptation to Climate o Lao PDR: Climate adaptation in wetlands areas o Myanmar: Adapting community forestry landscapes and associated community livelihoods to a changing climate, in particular an increase in the frequency and intensity of extreme weather events	https://www.thegef.org/gef/sites/thegef.org/files/publication/ 23469_LDCF.pdf

Name	Type	Scope	Project examples	Application Information
SCCF	Adaptation and mitigation	Various climate actions in all vulnerable developing countries	o Thailand: Strengthening the Capacity of Vulnerable Coastal Communities to Address the Risk of Climate Change and Extreme Weather Events o Viet Nam: Climate-resilient Infrastructure in Northern Mountain Province of Viet Nam	http://www.ctknetwork.org/wp-content/documents/pdf/Accessing-SCCF.pdf
Adaptation fund	Adaptation	Project sectors: Agriculture Coastal Management DRM Food security Rural Development Water management Water Management	o Cambodia: Enhancing Climate Resilience of Rural Communities Living in Protected Areas o Myanmar: Addressing Climate Change Risks on Water and Food Security in the Dry Zones	https://www.adaptation-fund.org/apply-funding/project-funding/project-proposal-materials/
Green Climate Fund (GSF)	Adaptation and mitigation	Investment priorities include: Energy generation and access Climate-compatible cities Agriculture Forestry SIDSs	o Viet Nam: Improving the Resilience of Vulnerable Coastal Communities to Climate Change Related Impacts	http://www.green-climate.fund/ventures/accreditation

MULTILATERAL AND BILATERAL CLIMATE FINANCING MECHANISMS

Climate financing is also available via multi- and bilateral donor sources. Table 6 and Table 7 below provides a summary of existing multi- and bilateral climate funds, besides the UNFCCC financing mechanisms.

Table 6: Examples of available multilateral climate funds

Name of Fund	Administration	Focus Area	Further Information
Clean Technology Fund	World Bank	Mitigation	Programmed and approved projects based on country plans: www-cif.climateinvestment-funds.org/country
Strategic Climate Fund	World Bank	Adaptation, Mitigation, REDD	
Forest Investment Program	World Bank	REDD	
Pilot Program for Climate Resilience	World Bank	Adaptation	
Scaling-Up Renewable Energy Program for Low Income Countries	World Bank	Mitigation	
Forest Carbon Partnership Facility	World Bank	REDD	www.unredd.net/index.php?option=com_content&view=article&id=2088&Itemid=482
UN-REDD Programme	UNDP	REDD	www.un-redd.org
Climate Change Fund	Asian Development Bank	Adaptation, Mitigation	www.adb.org/site/funds/funds/climate-change-fund
Urban Climate Change Resilience Trust Fund (UCCRTF)	Asian Development Bank	Adaptation	www.adb.org/site/funds/funds/urban-climate-change-resilience-trust-fund
Integrated Disaster Risk Management (IDRM) Fund	Asian Development Bank	Adaptation	www.adb.org/site/funds/funds/integrated-disaster-risk-management-fund
Future Carbon Fund (FCF)	Asian Development Bank	Mitigation	www.adb.org/site/funds/funds/future-carbon-fund-fcf
Global Climate Change Alliance	European Commission	Adaptation, Mitigation, REDD	www.gcca.eu/technical-and-financial-support
Global Energy Efficiency and Renewable Energy Fund	European Commission	Mitigation	www.geeref.com

Table 7: Examples of available bilateral climate funds

Country	Name of Fund	Focus Area	Further Information
Canada	International Climate Financing	Adaptation, Mitigation, REDD	www.climatechange.gc.ca/finance/
Germany	International Climate Initiative	Adaptation, Mitigation, REDD	www.international-climate-initiative.com/en/
Japan	Japan Fund for the Joint Crediting Mechanism (JFJCM)	Mitigation	www.adb.org/site/funds/funds/japan-fund-for-joint-crediting-mechanism
Norway	International Climate and Forest Initiative	REDD	www.norad.no/en/front/funding/climate-and-forest-initiative-support-scheme/
United Kingdom	International Climate Fund	Adaptation, Mitigation, REDD	www.gov.uk/government/publications/international-climate-fund/international-climate-fund

Lastly, regional and national funding initiatives also exist, which have the aim of up-scaling and better prioritizing climate finance in a certain region or country. Examples include the Congo Basin Forest Fund, the Amazon Fund in Brazil and the Indonesia Climate Change Trust Fund.

Box 6: Initiatives tracking climate finance

- Climate Funds Update

  www.climatefundsupdate.org/listing/strategic-climate-fund
- REDD X Tracking Forest Finance

  URL: www.reddx.forest-trends.org
- Voluntary REDD+ Database

  URL: www.reddplusdatabase.org
- REDD Countries Database

  URL: www.theredddesk.org/countries
- UN Multi-Partner Trust Fund Office Gateway

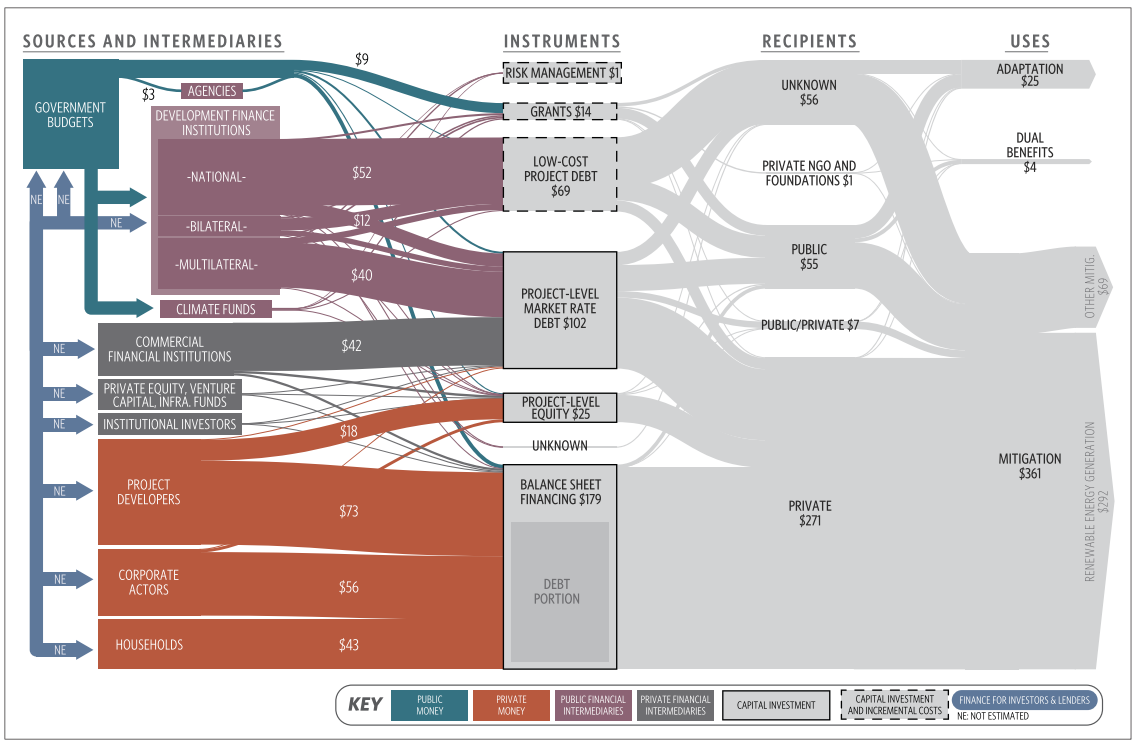
  URL: www.mdtf.undp.org
- Independent Fast Start Finance Tracking of the World Resource Institute

  URL: www.wri.org/sites/default/files/pdf/climate_finance_pledges_2012-11-26.pdf

ANALYSIS OF THE CURRENT CLIMATE FINANCING LANDSCAPE

As for the funding sources, climate finance is provided both by various public and private actors. An annual review of the global landscape of climate finance conducted by the Climate Policy Initiative (CPI), showed that in 2013 and 2014, 38% of global climate finance (approximately USD 148 billion) was provided by public sources, while 62% (USD 243 billion) was from private sources. Figure 15 provides an overview of the global climate financing landscape as it was in 2015.

Figure 15: The flows of climate finance in 2015

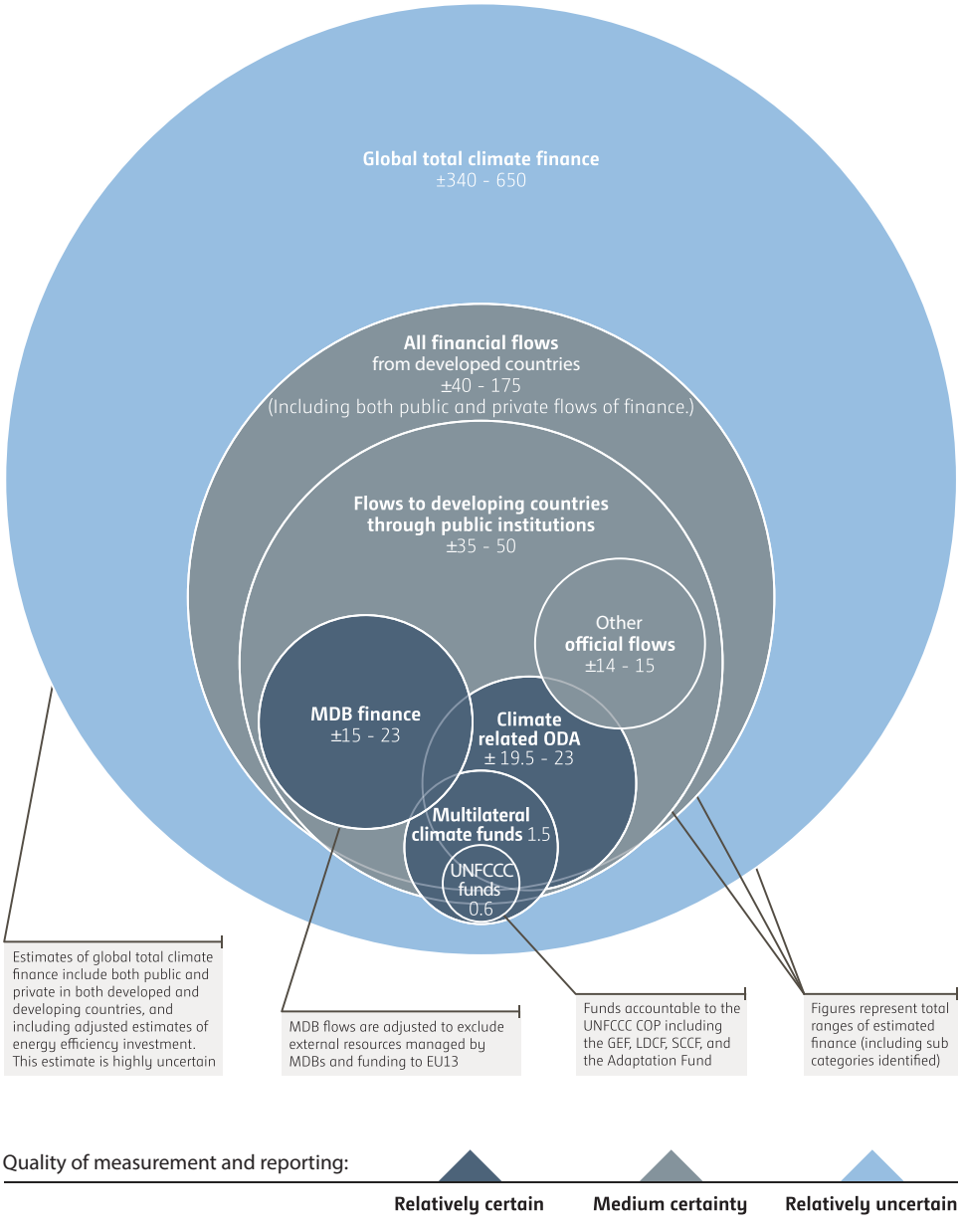


Source: Climate Policy Initiative, 2015

Another assessment of the global climate finance was conducted by the UNFCCC Standing Committee on Finance (SCF) which was established as part of the Cancun Agreement with the objective of assisting the COP "...in relation to the Financial Mechanism of the Convention" which includes objectives such as "...measurement, reporting and verification (MRV) of support provided to developing country Parties" (UNFCCC, 2016e).

The SCF conducts a biennial assessment of climate finance related information provided by Parties in their National Communications (NCs) and Biennial Update Reports (BURs), the first of which was completed in 2014 covering the period 2010 – 2012. As per the report, the SCF estimated a flow of USD 40 billion to USD 175 billion per year from developed countries to developing countries, out of which public finance accounted for USD 35 billion to USD 50 billion, whereas private finance ranged from USD 5billion to USD 125 billion. Figure 13 provides a snapshot of global climate finance flows, including flows specifically from developed countries to developing countries from 2010 to 2012.

Figure 16: Flow of Climate Finance in 2010-2012 (in $ per year) as per UNFCCC Standing Committee on Finance



Source: UNFCCC Standing Committee on Finance, 2014

A major development with respect to climate finance took place at the 2009 Copenhagen climate summit, where developed countries promised to annually jointly mobilise USD 100 billion of climate finance by 2020 for mitigation and adaptation in developing countries. While the commitment did not include any specific targets for the financing levels to be achieved within the timeframe to 2020, an assessment of climate finance flows from developed countries to developing countries between 2013 and 2014 was carried out with the objective of informing the negotiations on climate finance at COP21 in Paris (OECD, 2015).

The report estimated that climate finance flows from developed to developing countries had reached USD 62 billion in 2014, up from USD 52 billion in 2013, with bilateral public climate finance representing a significant proportion, i.e. USD 22.8 billion per year and multilateral climate finance attributable to developed countries estimated at USD 17.9 billion in 2013-14. Thus, approximately 71% of the total funds comes from public finance. However, these numbers were challenged by a number of govern-

ments, think tanks and analysts for reasons such as including funding for projects where climate change was not the principal objective, non-concessional financing, and export credit guarantees (Deutsche Klimafinanzieurg, 2015). A paper by the India's Ministry of Finance suggested that the number could be as low as USD 2.2 billion (Ministry of Finance, Government of India 2015).

At the Paris negotiations, climate finance was considered to be an issue of the highest importance because many developing countries had listed mitigation commitments in their INDCs as conditional upon receiving international "support" – broadly referring to finance and to some extent, technology transfer. The developing countries, thus wanted firm commitments from developed countries, 5 year cycles for setting climate finance targets and language that would require developed countries to ensure that the finance would be "new and additional" rather than already promised aid repackaged as climate finance.

Eventually, the Paris Agreement ended up offering nothing new or substantial to developing countries. It requires that developed countries provide financial resources to assist developing country Parties in both mitigation and adaptation; however this commitment is already enshrined in the UNFCCC. Instead of ratcheting up the promised climate finance from USD 100 billion per year after 2020, the accompanying decisions text extends this promise till 2025. Afterwards, a new number is to be agreed upon with USD 100 billion per year as a floor.

However, the Agreement did take into consideration the fact that adaptation efforts were receiving a very small share of the overall climate finance flows. As per the OECD report, only 16% of international climate finance went into adaptation in 2013 and 2014. Thus, the Agreement mentions that the scaled up financial resources should ideally be balanced between adaptation and mitigation efforts. This is an important development for ASEAN as it called for Parties to "…recognise the extreme vulnerability of ASEAN Member States to climate change, and therefore reflect the importance of strengthening adaptation and climate resilience capacity in the 2015 agreement" as part of its Joint Statement on Climate Change to COP21 (ASEAN, 2015).

5. CLIMATE COOPERATION IN THE ASEAN COMMUNITY

The ASEAN Member States (AMS) have been working on harmonizing their environmental policies since the 1990s when the first regional Strategic Plan of Action on the Environment was introduced for the period 1999-2004 (Trevisan, 2013). Joint climate co-operation activities were launched in the second of half of the 2000s. From one side, they aim to establish a joint representation at the global UNFCCC negotiations. From the other side, they work for the harmonization of climate change activities at the regional (ASEAN) level.

ASEAN COUNTRIES AT THE CLIMATE CHANGE NEGOTIATIONS

According to the official UN grouping, the Southeast Asian states are part of the Asian states at the negotiations. As for negotiating coalitions, the AMS are members in the G77 and China group; Cambodia, Lao PDR and Myanmar are also involved in the LDC group while Malaysia, Philippines and Thailand participate in the LMDC group. Many of the AMS are also members in various international and regional climate initiatives. An overview of AMS membership in negotiating coalitions and other climate initiatives is presented in Table 5.

Table 8: ASEAN Member States in Climate Negotiating Groups and Climate Initiatives

	G77	LDC	LMDC	Coalition for Rainforest Nations	Global Methane Initiative	International Partnership on Mitigation and MRV	LEDS Global Partnership	Asia LEDS Partnership	REEEP	REDD+ partnership
Brunei Darussalam	☐							☐		
Cambodia	☐	☐						☐		☐
Indonesia	☐			☐	☐	☐	☐	☐	☐	☐
Lao PDR	☐	☐						☐		☐
Malaysia	☐		☐	☐		☐		☐		☐
Myanmar	☐	☐						☐		
Philippines	☐				☐	☐		☐	☐	☐
Singapore	☐					☐		☐	☐	☐
Thailand	☐		☐	☐	☐	☐		☐		☐
Viet Nam	☐			☐	☐	☐	☐	☐		☐

In recent years, the AMS have also recognized the importance of joint representation at the climate negotiations and have sought to promote their common regional interests. As a result, the AMS country leaders issued a joint statement for the COP13, 15, 16 and 17, respectively in 2007, 2009, 2010, 2011 and 2014.[44] On 21 November 2015 in Kuala Lumpur, AMS country leaders adopted a joint statement on climate change to the COP21 on the occasion of its 27th ASEAN Summit. The pre-COP21 statement focused on the Paris agenda and urged all Parties to the UNFCCC to recognise the extreme vulnerability of AMS to climate change, and therefore reflect the importance of strengthening adaptation and climate resilience capacity in the 2015 Agreement.[45]

Over the years, joint AMS statements have recognised climate change as a serious threat to humanity and sustainable development and the high climate vulnerability of the ASEAN. The importance of 'common but differentiated responsibilities' was also highlighted and the statements repeatedly called on Annex I Parties to continue taking the leading role in climate change activities by setting more ambitious emissions mitigation commitments, and by providing financial and technological support to developing countries. At the same time, the statements emphasised the AMS' willingness to contribute to the global negotiations, amplify their regional co-operation to tackle the climate challenge, implement mitigation commitments and support clean energy and low-carbon development. Furthermore, the importance of the Clean Development Mechanism, the Adaptation Fund and the REDD+ mechanisms, were also underlined in the statements.

Box 67: ASEAN Standpoints on REDD

As an important forestry block, controlling approximately 16% of global tropical forests, the AMS also issued a position paper in 2008 on Reducing Emission from Deforestation and Forest Degradation (REDD) in Developing Countries (ASEAN, 2008). It suggested that emissions measuring methods as well as mitigation activities should be less complicated and called for greater investment, technology transfer and capacity-building related to deforestation.

In the 2009-2011 statements, AMS recurrently confirmed the importance of REDD+ for the region and outlined the importance of such a mechanism in ensuring emissions mitigation, biodiversity protection and in contributing to poverty reduction. Most recently the ASEAN released a statement on the methodological issues related non-market based approaches and non-carbon benefits under the REDD+ mechanism in March 2014 (ASEAN, 2014).

From 2009 onwards, the climate vulnerability of the AMS was also outlined in the statements. In 2009, the AMS outlined the vulnerability of urban population, called for an integrated coastal and ocean management approach and for the creation of the Adaptation Framework. In 2011, in order to assess climate impacts and vulnerabilities for the region, the preparation of an ASEAN Report on Climate Change Impacts and Vulnerability was announced.

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[44] *ASEAN Joint Statement on Climate Change to COP20 to the UNFCCC and CMP10 to the Kyoto Protocol (25th ASEAN Summit, 2014); ASEAN Leaders' Statement on Climate Change to COP17 to the UNFCCC and CMP7 to the Kyoto Protocol (19th ASEAN Summit, 2011); ASEAN Leaders' Statement on Joint Response to Climate Change Ha Noi, 9 April 2010, ASEAN Joint Statement on Climate Change to COP15 to the UNFCCC and CMP5 to the Kyoto Protocol (15th ASEAN Summit, 2009); ASEAN Declaration on the 13th session of the Conference of the Parties to the UNFCCC and the 3rd session of the CMP to the Kyoto Protocol (2007) URL: http://environment.asean.org/documentation/*

[45] *ASEAN Joint Statement on Climate Change to the 21st session of the Conference of Parties to the UNFCCC (2015). URL: http://environment.asean.org/download/climate-change/agreement/ASEAN-Joint-Statement-on-Climate-Change-Adopted.pdf*

REGIONAL CLIMATE CO-OPERATION AMONG THE ASEAN MEMBER STATES

The AMS countries confirmed the importance of regional climate co-operation in various meeting statements and declarations since 2007.[46] After initial efforts, the ASEAN climate co-operation was further strengthened with the launch of the **2009-2015 Road Map for an ASEAN Community**. One of the strategic objectives (D.10) of the ASEAN Socio-cultural Community Blueprint under the Environmental Sustainability section is to respond to climate change and to address its impacts. It aims to encourage a common understanding of the adverse effects of climate change and to ensure the implementation of necessary mitigation and adaptation actions in all sectors affected.

As foresaw in the Socio-cultural Community Blueprint, the **ASEAN Climate Change Initiative (ACCI)** was established in 2009 at the 11th ASEAN Ministerial Meeting on Environment. Co-ordinated by the ASEAN Working Group on Climate Change (AWGCC), the ACCI serves as a consultative platform to strengthen the co-operation and co-ordination among sectoral institutions as well as to enhance ASEAN representation at international negotiations.

At the 16th ASEAN Summit in 2010 the ASEAN Leaders' issued a 'Joint Response to Climate Change'. They repeatedly urged for a global solution to the climate challenge as well as pledged for the development of a climate change resilient ASEAN community (ASEAN, 2010). In line with the latter, an **ASEAN Action Plan on Joint Response to Climate Change (AAP-JRCC)** was developed by the AMS. Based on the Roadmap for an ASEAN Community 2009-2015, it seeks regional co-operation opportunities in terms of adaptation and mitigation options, climate research and global climate negotiations (ASEAN, 2012b). The AWGCC of the ACCI was designated for the implementation of the Action Plan and a lead country was appointed for the co-ordination of the implementation of each action programme point.

Box 8: Summary of the detailed programme of the ASEAN Action Plan on Joint Response to Climate Change

- **Adaptation:** Actions include strengthened climate research and R&D activities, an information and experiences exchange about adaptation efforts and development, and an ASEAN work programme for disaster risk reduction and management. The importance of building resilience in the hydrological and agricultural sectors to reduce water stress and enhance food security is outlined.
- **Mitigation:** Actions include the exchange of emissions reduction best practices in different sectors (such as energy production, land use and forestry), identification of low-carbon development solutions, promotion of Nationally Appropriate Mitigation Actions (NAMAs), MRV and CDM mechanisms of the Kyoto Protocol and development of a carbon cap and trade system in the region.
- **Common activities for finance and investment, technology transfer and capacity building:** Actions include the promotion of multilateral funds, private sector investments, support for technology transfer by exchange of experiences and by strategic co-operation with the private sector and capacity-building of relevant stakeholders related to national GHG inventories, to global negotiations and to adaptation capacities.
- **Strengthen co-operation with other regional co-operations:** To promote awareness of climate change and enhance climate-related research.

[46] *Examples include the ASEAN Declaration on Environmental Sustainability (13th ASEAN Summit in 2007), the Singapore Declaration on Climate Change, Energy and the Environment (3rd EAS Summit in 2007), the Singapore Resolution on Environmental Sustainability and Climate Change (11th AMME in 2009).*

The ASEAN countries commitment to the ACCI and the AAP-JRCC was also strengthened in the Bangkok Resolution on ASEAN Environmental Cooperation (ASEAN, 2012c). In addition, the co-ordinating body of the ACCI, the AWGCC also meets regularly to discuss the implementation of climate activities under the ASCC Blueprint 2009-2015.[47]

Furthermore, many other climate-relevant activities are being undertaken in the framework of the ASEAN co-operation. These include both mitigation and adaptation actions under general environmental protection, disaster risk reduction, sustainable energy, transport, urban development, natural resource management and agricultural production agreements and initiatives (Letchumanan, 2010 and Trevisan, 2013).

Table 9: ASEAN agreements and initiatives relevant to climate change

Theme	Agreement/Initiative
Air pollution	The ASEAN Agreement on Trans-boundary Haze Pollution
Disaster risk management	ASEAN Agreement on Disaster Management and Emergency Response 2010-2015
Sustainable energy	ASEAN Plan of Action for Energy Cooperation 2010-2015
Sustainable transport	ASEAN-Japan Action Plan on Environment Improvement in Transport Sector ASEAN-Germany technical assistance project on "energy efficiency and climate change mitigation for the land transport ASEAN-EC Air Transport Integration Project (AATIP)
Urban planning	ASEAN Initiative on Environmentally Sustainable Cities Cool ASEAN, Green Capitals Initiative ASEAN Environmentally Sustainable City (ESC) Award Programme
Environmental education	ASEAN Environmental Education Action Plan (AEEAP)
Water resource management	The ASEAN Strategic Plan of Action on Water Resources Management (ASPA-WRM) ASEAN Marine Water Quality Management Guidelines & Monitoring Manual
Natural resource use and Agriculture	The ASEAN Multi-Sectoral Framework on Climate Change: Agriculture, Fisheries and Forestry Towards Food Security (AFCC Framework) The Rehabilitation and Sustainable Use of Peatland Forests in South East Asia Project
Nature conservation	ASEAN Heritage Parks (AHP) Programme Heart of Borneo Initiative (HoB) Coral Triangle Initiative (CTI)

Source: Letchumanan, 2010, Trevisan 2013 and ASEAN Co-operation on Environment website

[47] *The 5th Meeting of the ASEAN Working Group on Climate Change (AWGCC) was held in April 2014 in Jakarta, Indonesia.*

In the future, as emphasised in the Road Map for an ASEAN Community 2009-2015, the ASEAN aims to address climate change more comprehensively through all-sector co-operation. Besides the existing regional climate change co-operation setting, it is also crucial that the AMS set and pursue national standards/commitments and undertake adaptation and mitigation actions at the national level. These initiatives can amplify the results of the regional climate co-operation activities and accelerate the move towards climate-resilient societies and low-carbon economic development. This commitment was further reiterated in the Declaration on the ASEAN Post-2015 Environmental Sustainability and Climate Change Agenda, adopted on the occasion of the 27th ASEAN Summit in Kuala Lumpur, Malaysia, on 21 November 2015. The Declaration is one in which all AMS declared their commitment to implement actions aligned with the ASEAN Action Plan on Joint Response to Climate Change and adopt action plans on mitigation and adaptation at the national and regional level (ASEAN, 2015). ASM, in their ASEAN Joint Statement On Climate Change to the 21st Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) also agreed to "explore means of further enhancing sustainable development efforts throughout the ASEAN region during the pre-2020 period, recognising that such efforts can be the fastest and most efficient way of closing the "ambition gap"" (ASEAN, 2015b).

THE PARIS AGREEMENT AND ASEAN

The Paris Agreement and INDCs submitted by countries signal their willingness to take action to reduce their emissions in the context of their respective national circumstances. While overall pledges made in the INDCs fall short of meeting the target of keeping the global temperature rise below 2°C, one must see this as the first step in the context of bigger ambitions. The Agreement aspires to efforts that could lead to keeping the global temperature rise to a more ambitious 1.5°C, early peaking of emissions, and a zero net emission world in the second half of this century. With these broad contours, a robust arrangement in place for monitoring, reporting and verification of mitigation actions, and a global review every five years with a view to ratcheting up ambition in NDCs, one can remain optimistic about the delivery of commitments.

Progressively Ambitious Targets

While many of the ASEAN countries still rely on fossil fuels and other high carbon-intensive processes, the clear articulation in their INDCs is to either reduce emission intensity of growth (e.g. Malaysia, Singapore), undertake emission reductions from business-as-usual levels (e.g. Indonesia, Philippines, Thailand, and Viet Nam), increase the share of renewable energy in the energy mix (e.g. Lao PDR) or improve forest cover (e.g. Cambodia, Lao PDR). All of these measures are indicative of their resolve to shift their national emissions trajectories towards a low-carbon path.

However, the success of the Paris Agreement will depend on countries progressively setting more ambitious targets with each successive global stocktake. Thus, ASEAN countries must also continuously monitor their progress towards their 2020 and 2030 targets. At the same time, they must keep track of technological advancements and their financial status to determine whether they can graduate towards higher ambition targets or target-types such as absolute emission reductions compared to a base year.

Transparency and Accountability

Transparency and accountability are key to the success of Paris Agreement because it entails a pledge and review system rather than top-down targets with stringent compliance. The regular stocktaking of the achievement of pledges in 5-year cycles beginning in 2023 is a facilitative mechanism to ensure that the global trajectory of emissions is monitored, taking into account mitigation, adaptation, means of implementation and support, equity, and the best available science.

The ASEAN countries will also have to play their part by ensuring that they comply with the requirements of the transparency framework and disclose accurate information in a timely manner, so that the stocktakes can accurately measure global progress. Current institutional frameworks in ASEAN

countries for reporting information as required currently will have to be strengthened further and the technical capability of these institutions will have to be upgraded as the new MRV systems supersede the current ones.

Finance and Support

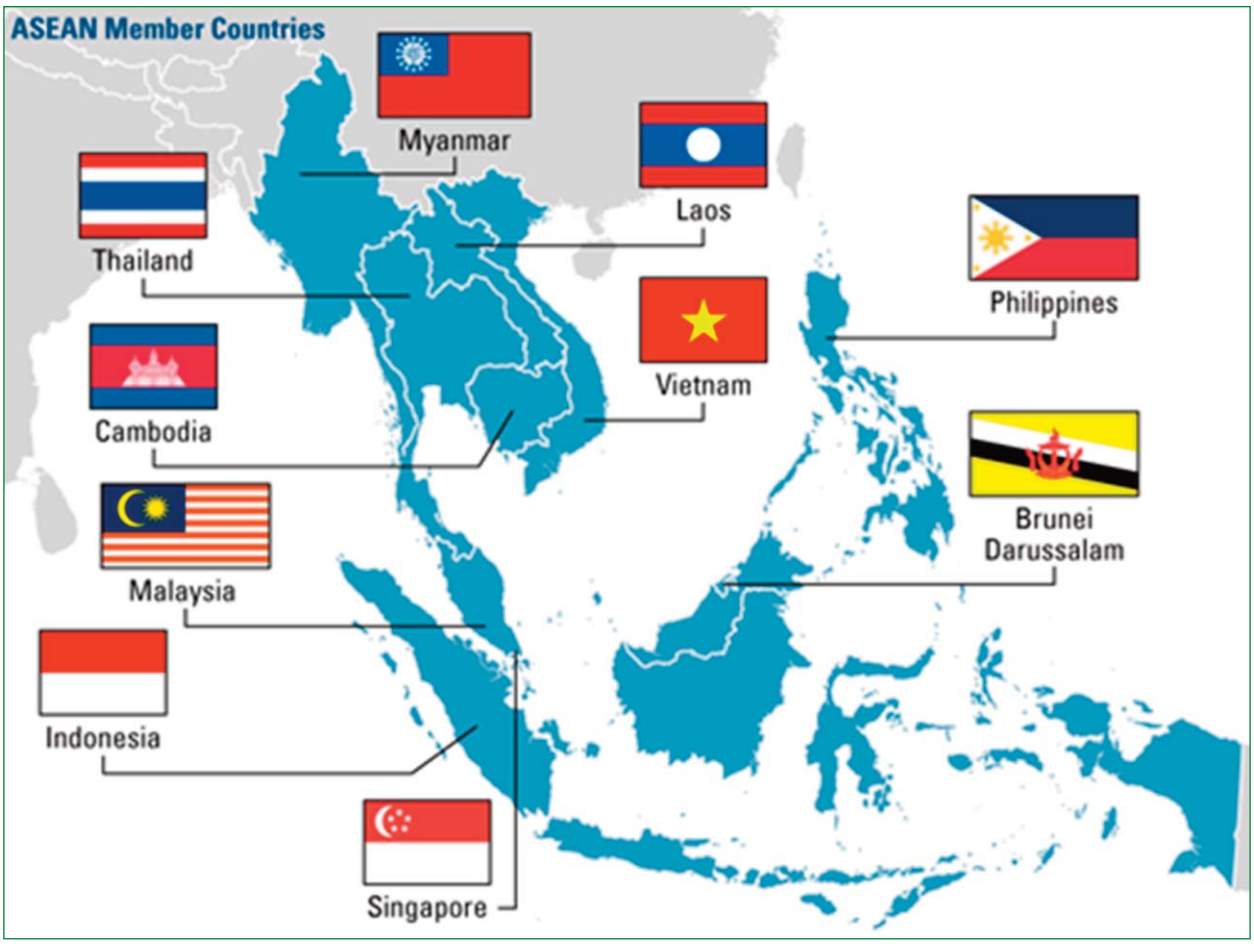
The Agreement has reiterated the goal that developed countries must jointly mobilize USD 100 billion per year from 2020. The decision text also states that the USD 100 billion target is a floor value and that a new target will be set before 2025, bearing in mind the needs and priorities of developing countries. This is a clear recognition that financing needs will be higher in the future.

To access this funding, a first step that countries in ASEAN could take would be to clearly articulate in their NDCs the "conditional" actions and contributions, along with the financing required for such actions. In addition, countries in the region will need to build adequate capacity and institutions to tap international climate finance from various funds. For instance, to access the Green Climate Fund, they would need to establish National Designated Authorities (NDA) with clear mandates, and perhaps, if they desire so, National Implementing Entities (NIE) for direct access. In addition, a clear articulation of capacity building needs and associated support required could be channelled through the Paris Committee on Capacity Building (PCCB) established under the Paris Agreement. In this section we provide an overview of the climate vulnerabilities, adaptation needs, basic emissions characteristics, climate change strategies, policies and activities of each ASEAN Member State.

6. THE CLIMATE POLICY PROFILE OF THE ASEAN MEMBER STATES

This chapter provides an overview of climate vulnerabilities, adaptation needs, emissions levels, climate change strategies, policies and activities of all ASEAN Member States.

Figure 17: ASEAN Member Countries



Source: Strengthening Human Rights and Peace Research and Education in ASEAN (ShapeSEA)

Table 10: Selected socio-economic indicators for ASEAN Member States

Country	Total land area	Total population	Population density	Annual population growth	GDP at current prices	GDP per capita at current prices	
	km²	*thousand*	*persons per km²*	*%*	*million*		*PPP*
	2014	2014	2014	2014	2014	2014	2014
Brunei Darussalam	5,769	413.0	72	1.7	17,108	41,424	82,850
Cambodia	181,035	15,184.1	84	1.5	16,771	1,105	3,334
Indonesia	1,860,360	252,164.8	136	1.3	983,571	3,901	11,498
Lao PDR	236,800	6,809.0	29	1.9	11,777	1,730	5,096
Malaysia	330,290	30,261.7	92	1.0	326,346	10,784	24,607
Myanmar	676,577	51,486.0	76	0.9	65,785	1,278	4,923
Philippines	300,000	101,174.9	337	1.8	284,910	2,816	6,846
Singapore	716	5,469.7	7,638	1.3	307,872	56,287	82,714
Thailand	513,120	68,657.0	134	0.6	373,225	5,436	14,333
Viet Nam	330,951	90,630.0	134	1.0	186,224	2,055	5,644
ASEAN Total	4,435,618	622,250.2	140	1.2	2,573,589	4,136	10,700

Source: ASEAN statistics, 2015

BRUNEI DARUSSALAM

Table 11: Brunei Darussalam's national statistics

	2014
GDP per capita (current USD)	38457.74
Population (thousand)	399.80
Population density (people per km2 of land area)	69.30
Share of urban population (% of total)	77
Percentage of people under poverty line	-

Source: ASEAN Statistics, 2015; IMF Country Report, 2014; World Bank, 2011

Brunei Darussalam's economy benefits from the revenues from extraction, refining and export of its oil reserves. Its most important natural resource is the country's extensive forest cover, which covers approximately 75% of the national land area.

Observed and Projected Climate Impacts

Expected impacts of climate change include higher temperatures in the hot season and more intense precipitation in the wet season (Brunei Darussalam, 2015). As a result, further increased flood risk and landslides; sea level rise in low-lying areas, heat stress and transboundary haze pollution is predicted. As a result, rice production may also be impacted in the future.

Table 12: Projected changes in temperate and precipitation

Climate parameters	
Projected annual temperature change (2031-2060 °C)	2-3
Projected annual precipitation change (2045-65, mm)	-185 to 111
Projected change in annual hot days/warm nights	15/27
Projected change in annual cold days/cool nights	-2/-3

Source: World Bank, 2011; Meteorological Service Singapore and Met Office Hadley Centre, 2014

Emissions

Brunei Darussalam submitted its Initial National Communication (INC) and GHG emissions inventory on 22 April 2016 (UNFCCC, 2016). In its INDC submission on 1 December 2015, Brunei Darussalam explained that the documents were still being prepared and that it would be the first accurate estimation of sectoral GHG emissions and will assist with policy development, along with international reporting requirements (Brunei Darussalam, 2015).

In 2014, the UNFCCC issued a Country Brief on Brunei Darussalam citing figures up to 2012 for fuel combustion and GHG emissions (UNFCCC, 2014b).

Table 13: Emissions Summary for Brunei Darussalam

Total GHG/CO_2 emissions	2010 (UNFCCC)	2011 (World Bank)	2012 (WRI)
CO_2 emissions without LUCF (kt)		9,743.20	8,400.00
CO_2 net emissions/ removals by LUCF (kt)			
CO_2 net emissions/removals with LUCF (kt)			
GHG emissions without LUCF (kt)	10,200		20,050.00
GHG net emissions/removal by LUCF (kt)	2,630		
GHG net emissions/removal with LUCF (kt)	7,400		22,070.00
CO_2 emissions per capita emissions without LUCF (metric ton)		24.40	20.38

Source: Brunei Darussalam Ministry of Development, 2015, World Bank, 2016 & WRI, 2016

CLIMATE CHANGE STRATEGIC PLANNING

Brunei Darussalam acceded to the United Nations Framework Convention on Climate Change (UNFCCC) on 7 August 2007 and it entered into force on 5 December 2007. The country later acceded to the Kyoto Protocol on 20 August 2009 and it entered into force on 18 November 2009. The country has also signed different regional environmental agreements, such as the ASEAN Agreement on Trans-boundary Haze Pollution, the ASEAN Plan of Action on Energy Cooperation of 2010-2015 and the Heart of Borneo Declaration in 2007.

Brunei Darussalam focuses on forestry and sustainable development and has previously developed its first **National Environment Strategy** in 1996. Already in its 8th National Development Plan (2001-2005), the Brunei Government allocated BND 91.9 million for the implementation of environment related projects, which constituted 1.26% of the total development allocation. Subsequently, the country also issued the Brunei 2035 Vision or "Wawasan Brunei 2035" and its underlying 9th and 10th NDP for 2007-2012 and 2012-2017 respectively. Brunei Darussalam's INDC highlights that the *"priority of the Vision to safeguard the welfare of their people and its plan of ensuring a clean, green and healthy environment for every citizen" (Brunei Darussalam, 2015, p2)*. In line with the principles of the Vision, in order to promote sustainable economic development, sectoral strategies were also developed.

Regarding climate change, its INDC notes that the Government of Brunei Darussalam is integrating the need to enhance climate resilience and adaption to climate change including the protection of both terrestrial and marine biodiversity into national development plans. Brunei Darussalam's Disaster Management Order (2006) is an example of a national plan and strategy to enhance climate resilience. There is also a new environmental law called the Environmental Protection and Management Order 2016 which is currently undergoing refinement before being gazette (Brunei Darussalam Ministry of Development, 2016). Further, its INDC notes that *"sectoral adaptation plans currently exist; with further effort these can be developed into a national integrated and coordinated adaptation plan"* (Brunei Darussalam, 2015, p7). The INDC expects that plans that address extreme weather and climate events and the vulnerability study can provide starting points for a National Adaptation Plan (NAP) under the UNFCCC.

Climate Change Institutional Framework

The Department of Environment, Parks and Recreation was created in 1992 within the Ministry of Development to co-ordinate environmental protection activities in the country and at the international level.

The **National Council on Climate Change** was established with the aim to develop and implement climate change strategies, and is led by the Ministry of Development and the Energy Division at the Prime Minister's Office (Brunei Times, 2011).

To support the development of the national energy policy a National Energy Research Institution was created in 2011 (Brunei Darussalam, 2015).

Climate Actions

Brunei Darussalam aims to work on raising environmental awareness, mainstreaming environmental considerations into planning, extending natural resource assessment and information, improving the urban and rural environment, and protecting biodiversity, forests, coastal and marine areas (Brunei Darussalam, 2012). Examples of flagship initiatives include a Mangrove Tree Planting initiative by the local NGO Green Brunei, the Brunei Recycling Drive educational project, the Brunei Youth Environmental Leadership Programme, and the establishment of a solar power plant with 1.2 MW capacity. (Brunei Darussalam, 2012 and ACCAD, 2014).

Brunei Darussalam's INDC stated that the Energy Department Prime Minister's Office together with the Ministry of Finance are looking to identify suitable financial incentives which can be introduced for household appliances and in the transportation sector (Brunei Darussalam, 2015). On raising levels of awareness about climate change, the country's INDC noted that the Energy Department Prime Minister's Office with the Ministry of Education's Science, Technology and Environment Partnership will continue or further extend existing initiatives (e.g. an Energy Clubs to promote energy efficiency measures in schools or energy saving seminars for newly appointed government officials), as well as, it will launch additional initiatives (e.g. an Energy Week to promote energy efficiency measures to the public) and will target additional stakeholder groups, such as rural communities (Brunei Darussalam, 2015).

Intended Nationally Determined Contribution

Brunei Darussalam submitted its INDC on 1 December 2015. The INDC's mitigation component is summarised in the table below:

Table 14: Brunei Darussalam's INDC in sectoral breakdown

Sectors	Target	Base year	Target year
Energy	Reduce total energy consumption by 63%	From BAU	By 2035
	Reduce energy intensity by 45%	From 2005	
	Increase the share of renewables to 10%	n.a.	
Land Transport	Reduce carbon dioxide emission from morning peak hour vehicle use by 40%	From BAU	By 2035
Forestry	Increase the total gazette forest reserves to 55%	From current 41%	n.a.

Brunei Darussalam's INDC describes its implementation plans in the energy, land transport and forestry and land use sectors. In terms of energy, the country plans to implement a number of policies and regulatory frameworks for energy efficiency and conservation, including electricity tariff reform, building guidelines for the non-residential sector, standards and energy labelling for products and appliances, energy management policy and fuel economy regulation.

Other project based energy efficiency measures such as the increased use of energy efficient street-lights are also planned. The country intends to meet its share of renewables goal by increasing the use of solar power and waste-to-energy resources. In the land transport sector, Brunei Darussalam published its Land Transport Master Plan (LTMP) in 2014 in line with their Vision 2035 and it included plans to reduce by 40% morning peak hour carbon dioxide emissions against a BAU scenario in 2035. The country also intends to implement fuel standards, and promote electric and hybrid vehicles to meet its goals. In the forestry and land use sectors, 41% of the country's land area has already been gazette as forest reserves but work is underway to increase this to 55%. There has also been a ban on logging concessions in the forest reserves with the exception of restricted and controlled logging in designated Inter-Reverine Zones (IRZ). The INDC also highlighted Brunei Darussalam's involvement in the "Heart of Borneo" Initiative, a trilateral forest conversation agreement it signed with Malaysia and Indonesia in 2007 to protect its endemic forest and ecosystems.

The INDC identified implementation challenges including the lack of comprehensive legislative framework, weak institutional co-ordination and stakeholder collaboration; lack of national GHG inventory; limited research expertise and availability of technologies in the field of climate change mitigation and adaptation; and a general lack of social awareness.

The INDC also contains a section on adaptation, wherein it identifies climate related risks and priority sectors for Brunei Darussalam as well as details planning for implementation of the INDC and means of implementation.

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[The full references are included in the bibliography.]

CAMBODIA

Table 15: Cambodia's national statistics

	2014
GDP per capita (current USD)	897
Population (million)	15,184
Population density (people per km^2 of land area)	84
Share of urban population (% of total)	21
Percentage of people under poverty line	20.50

Source: ASEAN Statistics, 2015; World Bank, 2015

Cambodia is a low emitter and highly vulnerable country to the negative effects of climate change. Its developmental priorities include reducing the percentage of people living under the poverty line, which it successfully halved from 53% in 2004. Cambodia is largely agrarian, although industrial production has been steadily rising over the last two decades. Due to the lack of infrastructure and institutional capacities, the country's adaptive capacity is also limited, which further increases the economic losses related to natural disasters (World Bank, 2014).

Observed and Projected Climate Impacts

Cambodia has recently been facing more frequent natural disasters including floods and droughts. In the future, sea level rise will pose a significant threat to low-lying coastal areas, which will cause storm surges, high tides, coastal erosion and seawater intrusion (World Bank, 2014).

Table 16: Observed and projected changes in temperature and precipitation

	Observed	Projected
Temperature	+0.8 °C increase since 1960	+0.7-2.7 °C increase by 2060
Rainfall	Inconsistent and not yet significant changes	Expected to increase in the monsoon areas (–109 to 95 mm by 2045-2065)

Source: World Bank, 2014

Adaptation Needs

Support in accelerating adaptation efforts is required in three major areas (World Bank, 2014 and GSSD 2015):

- **Agriculture and forestry:** Introduction of climate-resilient crop varieties, grain banks for drought periods, improved water use, improved access to weather information for farmers, and improved forest resource management (including restoration and conservation).
- **Water resources:** Quality and quantity assessment studies, improved water and watershed management practices, and flood prevention methods.
- **Healthcare:** Health education programmes, health extension services, and malaria surveillance systems.
- **Coastal zones:** Climate proofing of infrastructure projects; adaptation plans in coastal areas; further and more detailed studies on vulnerabilities in coastal areas and adaptation solutions.

GHG Emissions

The latest available UNFCCC GHG emissions data is for 2000. Although the CO_2 emissions have increased since 1994, Cambodia's per capita CO2 emissions are still very low in international and regional comparisons. While mitigation actions are not priorities in Cambodia, it is important to protect the carbon sinks: the total forest cover has been considerably decreased, from 73.3% in 1990 to 53.6% in 2015 (World Bank, 2016). GHG emission estimations of the World Resource Institute indicate that the emissions from LULUCF had a significant contribution to Cambodia's GHG emissions by 2012.

Table 17: Emissions summary for Cambodia

Total GHG/CO_2e emissions	2000 (UNFCCC)	2011 (World Bank)	2012 (WRI)
CO_2 emissions without LUCF (kt)	2,052.59	4,495.74	4,170.00
CO_2 net emissions/removals by LUCF	-25,307.13		
CO_2 net emissions/removals with LUCF (kt)	-23,245.24		
GHG emissions without LUCF (kt)	24,108.70		25,850.00
GHG net emissions/removals by LUCF	-24.565.50		
GHG net emissions/removals with LUCF (kt)	-456.81		49,120.00
CO_2 emissions per capita emissions without LUCF (metric ton)		0.308	0.280

Source: GSSD 2015; World Bank 2016 and WRI, 2016

Climate Change Strategic Planning

Cambodia acceded to the UNFCCC on 18 December 1995 and it entered into force on 17 March 1996. The country later acceded to the Kyoto Protocol on 22 August 2002 and it was entered into force on 16 February 2005.

The Government of Cambodia laid down its development objectives in the Rectangular Strategies for Growth, Employment, Equity and Efficiency (2004) and in its latest **National Strategic Development Plans (NSDP)** for 2009-2013 and 2014-2018. The NSDP 2014-2018 set climate change as a cross-cutting issue, making climate change mainstreaming an integral part of development and poverty reduction efforts (Royal Government of Cambodia Ministry of Environment, 2016).

Linked to the national development objectives, Cambodia prepared a **National Adaptation Programme of Action on Climate Change** in 2006. In 2013, it adopted the **Climate Change Strategic Plan CCSP (2014-2023)**, defining eight strategic climate objectives and underlying action areas in line with existing development strategic objectives. These mostly focus on decreasing climate vulnerabilities and improving adaptation capacities, but also targets low-carbon economic development. The Climate Change Action Plan (CCAP) for 2016-18, developed by the Ministry of Environment, will operationalize the implementation of CCSP. The CCAP will implement seventeen actions corresponding to the eight objectives of the CCSP, with a total budget of USD 28-30 million (Royal Government of Cambodia Ministry of Environment, 2016).

The NSDP 2014-2018 also foresees that the Ministry of Environment will prepare the climate change legal framework, which will include updating the institutional arrangements, financing arrangements, and mainstreaming of climate change across sectors. Cambodia adopted an Energy Sector Development Plan (2005-2024) and a National Policy on Green Growth and National Green Growth Strategic Plan (2013-2030) in order to mainstream climate change action across sectors.

Climate Change Institutional Framework

In 2006, the **National Climate Change Committee (NCCC)** was set up under the **Ministry of Environment** as the main public entity responsible for planning and implementing policies, programs, and strategies for climate change issues in Cambodia. To support and advise the Committee, a **Climate Change Technical Team (CCTT)** was also established. The NCCC functioned as the inter-ministerial coordination mechanism for climate change activities until May 2015, but recently its functions were overtaken by the newly set up National Council for Sustainable Development (NCSD) (GSSD, 2015).

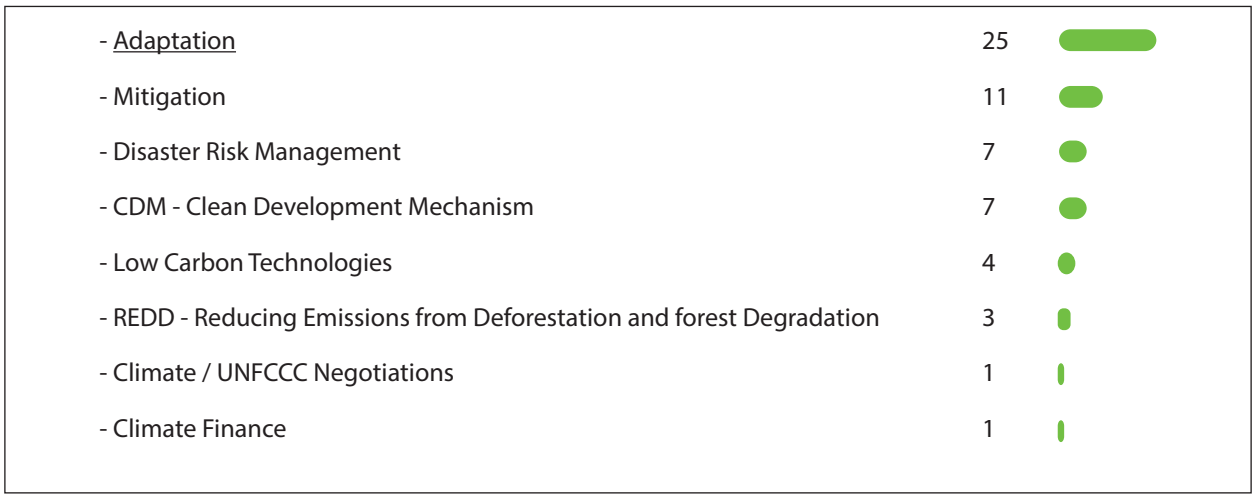
The Ministry of Environment also has a dedicated climate change department called the **Cambodia Climate Change Office (CCCO)** which was established in 2003. The CCCO is responsible for various activities including the: "... formulation of draft climate change plans and policies, implementation of the UNFCCC, assessment of new technologies to adapt to the adverse effects of climate change or to mitigate GHG emissions, and capacity building and awareness raising" (ibid, p.34). The main government body responsible for managing the REDD+ process is the REDD+ Taskforce and its Secretariat, but other bodies are also involved in implementation.

The government of Cambodia is also committed to supporting international climate efforts, and works closely with developed countries (Sweden, Denmark), international organisations (UNDP) and other regional partnerships (EU, Energy and Environment Partnership Mekong). The **Cambodia Climate Change Alliance** was created as the umbrella organisation to bring together multiple players.

Climate Actions

The majority of identified climate activities are targeting adaptation, with special focus on the agriculture sector. Initiatives include water management, flood prevention measures and enhanced resistance to climate change variables.

Figure 18: Number of climate projects and activities in Cambodia, by theme



Source: Southeast Asia Network of Climate Change Offices, 2016

Project examples include the Cambodia Community-Based Adaptation Program, the Harvest Project funded by USAID; the Climate Change and Adaptation Initiative of the Mekong River Commission; the recently concluded Pilot Program for Climate Resilience funded by the Climate Investment Funds or the currently ongoing ADB project on Mainstreaming Climate Resilience into Development Planning.

Institutional governance has been identified as one of the major implementation challenges, including both the lack of infrastructural and operational capacity. Besides, the second National Communication to the UNFCCC (GSSD, 2015) noted technical and financial constraints in addressing mitigation and adaptation challenges.

Intended Nationally Determined Contribution

Cambodia submitted its INDC on 30 September 2015 (Kingdom of Cambodia, 2015). The INDC includes both adaptation and mitigation actions based on its national circumstances. It comprises five sections that include national context; adaptation; mitigation; planning and implementation processes; and means of implementation.

As per the INDC, Cambodia will achieve a maximum emissions reduction of 3,100 GgCO2-eq as compared to a baseline scenario with emissions of 11,600 GgCO2-eq by 2030. This is equivalent to a reduction of 27% below BAU levels. The breakdown of the target is as follows:

Table 18: Cambodia's INDC in sectoral breakdown

Sectors	Target	Base year	Target year
Energy Industries	16%	n.a.	2030
Manufacturing industries	7%	n.a.	2030
Transport	3%	n.a.	2030
Other (e.g. waste and buildings)	1%	n.a.	2030

Note: Greenhouse gases included are carbon dioxide, methane and nitrous oxide.

In addition the estimated contribution of the LULUCF sector will be 4.7tCO2-eq/ha/year, which the government plans to achieve by increasing forest cover to 60% of national land area from the 2010 level of 57%. The INDC further notes that while LULUCF accounted for sequestration of 18,492 GgCO2 in 2010, this can drop to 7,897 GgCO2 by 2030 if no action is taken, hence achieving the LULUCF targets is important.

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INDONESIA

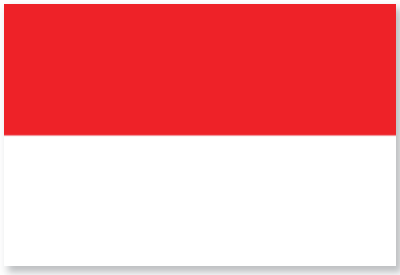


Table 19: Indonesia's national statistics

Country Parameters	2014
GDP per capita (current USD)	3495
Population (million)	242,326
Population density (people per km^2 of land area)	126.80
Share of urban population (% of total)	51.50*
Percentage of people under poverty line	43.30

**Data is for 2012*
Source: UN Statistics, 2014 and World Bank 2014b

Indonesia achieved rapid economic growth in the last decade, but about 40% of the population still lives under the poverty line of USD 2 per day. The rapid urbanization and industrialization, high population density – especially in low-lying areas – and the economic dependence on natural resources, all make Indonesia very vulnerable to climate change. The poor will be affected the most by its impacts (World Bank, 2014).

Observed and Projected Climate Impacts

Floods and sea level rise pose a major risk to highly populated urban centers and low-lying island areas. Data from 2011 show that 11.2% of the population live on land areas below 5m in height (World Bank, 2011). The country is also affected by droughts caused largely by El Niño, which negatively impact agricultural production. In the future, flood and drought events may worsen and will result in decreased food security, higher mortality rates, and increased disaster risk management expenses.

Table 20: Observed and projected changes in temperature and precipitation

	Observed	Projected
Temperature	0.3°C increase since 1990	0.3°C increase in each decade
Rainfall	2-3% increase since 1990	Changes in precipitation patterns
Sea level rise		5mm per year a total 0,4 to 1,75m by 2100

Source: World Bank, 2014, Republic of Indonesia National Action Plan for Climate Change Adaptation, 2013

Adaptation Needs

Priority adaptation areas consist of (World Bank, 2014):

- **Agriculture and food security:** improved farming practices, improved institutional co-ordination, data and information development, research and awareness raising activities.
- **Protection of coastal eco-systems:** vulnerability studies, capacity building of fishermen, integrated coastal zone management practices, protection of mangrove forests and improved forestation policies.
- **Water stress:** improved infrastructure and management practices should be developed.

GHG Emissions

The latest available UNFCCC emissions data is from 2012. While the emissions are relatively high, 60% of the GHG and 74% of CO2 emissions were from LUCF. Since 2000, Indonesia considerably increased its CO2 emissions, but the per capita CO2 emissions are still well below the global level. The GHG emissions calculation of the WRI indicates that the overall GHG emissions have also increased since 2000.

Table 21: Emissions summary for Indonesia

Total GHG/CO2 emissions	2012 (UNFCCC)	2011 (World Bank)	2012 (WRI)
CO2 emissions without LUCF (kt)	527,174	563,985.00	45,605.00
CO2 net emissions/removals by LUCF (kt)			
CO2 net emissions/removals with LUCF (kt)	1,222,152		
GHG emissions without LUCF (kt)	758,979		760,810.00
GHG net emissions/removals by LUCF (kt)			
GHG net emissions/removals with LUCF (kt)	1,453,957		1,981,000.00
CO2 emissions per capita emissions without LUCF (metric ton)		2.30	3.08

Source: Republic of Indonesia, 2015a; World Bank, 2016 and WRI, 2016

Climate Change Strategic Planning

Indonesia signed the UNFCCC on 5 June 1992 and ratified it on 23 August 1994. It entered into force on 21 November 1994. As for the Kyoto Protocol, Indonesia signed it on 13 July 1998, ratified it on 3 December 2004 and it entered into force on 3 March 2005.

Indonesia included both mitigation and adaptation objectives into its long-term **National Development Plan (2005-2025)**. Objectives relate to food security, development of clean energy technologies, and environmental and disaster management. To feed the second mid-term national development plan (2009-2014) with a long-term guidance on climate change policies, Indonesia adopted the **Climate Change Sectoral Roadmap** in 2010. The latest **National Medium Term Development Plan 2015-2019**

(RPJMN 2015-2019) specifies that the sustainable and inclusive economy is to be the foundation of Indonesia's development programme and it aims to promote green cities and the development of rural areas; tackle illegal extraction of natural resources and improve natural resources management.

In 2011, Indonesia also approved a **National Action Plan for Greenhouse Gas Emission Reductions** with a 26-41% GHG emission reduction commitment by 2020, and introduced targets for renewable energy and biofuels as well as energy conservation. In line with these commitments, Indonesia has already registered 2 NAMAs to the UNFCCC NAMA Registry. The first one is the Sustainable Urban Transport Initiative (registered in 2012), and the second one is the Smart Street Lighting Initiative (registered in 2014).

In 2013, a **National Action Plan for Climate Change Adaptation** was published. As a cross-cutting thematic plan, it targets food and energy security, health, settlements, infrastructure, and urban and coastal areas.

In the forestry sector, legislative, planning and enforcement activities still represent a concern, although several programmes have been implemented by the government, the private sector and communities affected by deforestation (London School of Economics, 2015 and Republic of Indonesia, 2015).

Climate Change Institutional Framework

In 2014, after the election of President Joko Widodo, the institutional framework for climate change issues has been considerably changed (World Bank, 2016c). Before 2014, the National Development Planning Agency was responsible for the development of climate change strategic documents. Involving 17 ministers and the Head of the Planning Agency, the **National Council on Climate Change** was established with the mandate to coordinate the implementation of climate change activities in Indonesia. In January 2015, the National Council on Climate Change (DNPI) and the REDD+ body (Badan REDD+) become part of the Directorate General of Climate Change of the Ministry of Environment and Forestry (London School of Economics, 2015 and World Bank, 2016c). The Directorate is responsible for policy formulation, implementation, monitoring and international co-operation in the field of climate change.

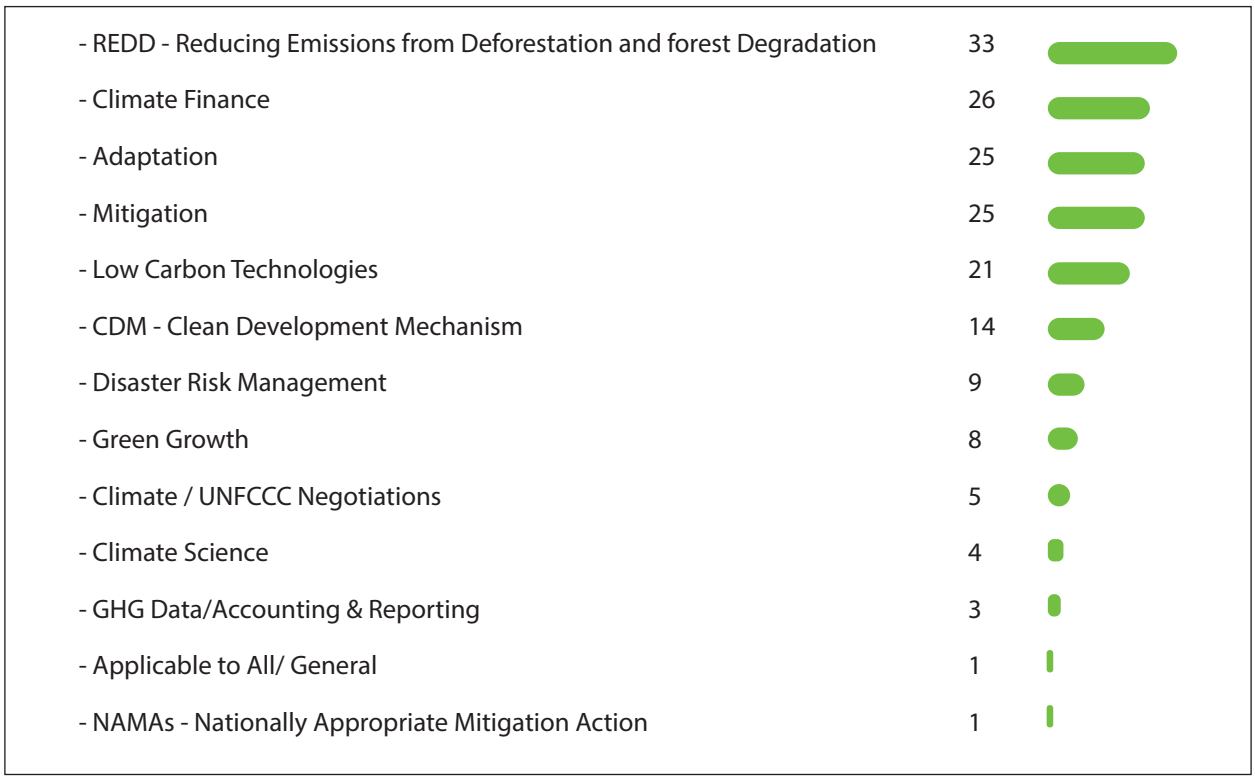
The **Ministry of Environment** also operates a National GHG Inventory System and the **Indonesian Climate Change Center** provides technical input on low-emission development strategies, MRV, and climate resilience. In 2005, the National Commission on Clean Development Mechanisms (KOMNAS MPB) was also established. Most recently, the Peatland Restoration Agency was established with support from the Norway-Indonesia bilateral partnership (Royal Norwegian Embassy in Jakarta, 2016).

A variety of NGOs also function in Indonesia, such as the Renewable Energy Society, the Geothermal Association and the Biofuels Association.

Climate Change Activities

Indonesia undertakes a variety of mitigation and adaptation activities. To mitigate emissions, Indonesia primarily plans to improve emissions from the LULUCF and peatlands. The REDD+ and the CDM mechanisms are considered as important programmes in this regard. Many of the adaptation activities concentrate on the most vulnerable agricultural sectors to improve water-management, introduce more climate resilient crops, introduce risk-management schemes, and increase awareness among farmers.

Figure 19: Number of climate projects and activities in Indonesia, by theme



Source: Southeast Asia Network of Climate Change Offices, 2016

The Climate Change Trust Fund and the Climate Change Programme Loan provides funding for a variety of climate objectives in Indonesia. In 2013, Indonesia initiated a unilateral Joint Crediting Mechanism with Japan, to encourage Japanese companies to invest in projects in Indonesia. An emissions trading scheme, the Nusantara Carbon Scheme (NCS) (ETS Skema Karbon Nusantara), was also introduced to facilitate voluntary carbon trading in the country (Jakarta Post, 2013). Supported by the World Bank led initiative, PMR, the scheme is being developed by the Carbon Trade Mechanism Division of the National Council on Climate Change (DNPI). Leading up to 2018, Indonesia is building market readiness and strengthening the fundamental infrastructure for carbon markets, particularly technical readiness around MRV framework (ADB, 2016).

Main implementation challenges are the lack of coordination between government institutions, the decentralisation of environmental management tasks, and limited mainstreaming of climate change policies into development plans, especially in public investment and regional planning. Mitigation-specific implementation challenges include government subsidies on fuels and lack of capacity-building support in applying for funds earmarked for the development of renewables. As for adaptation activities, local government agencies often lack management capacities and there is also a lack of knowledge about existing adaptation activities and lessons learnt from these. The poor institutional and financial capacities also hamper monitoring and enforcement of deforestation policies.

Intended Nationally Determined Contribution

Indonesia submitted its INDC on 24 September 2015. In its INDC, Indonesia pledged to reduce unconditionally 26% of its GHG against a BAU scenario of 2,881 GtCO2e by 2020 and 29% compared to the same BAU scenario by 2030. The INDC contains a conditional intended contribution of 41% reduction in emissions below BAU by 2030. This additional 12% is subject to provision in the global agreement including through bilateral cooperation, covering technology development and transfer capacity building, payment for performance mechanisms, technical cooperation, and access to financial resources. The INDC also states sectoral commitments, particularly in the forestry, energy and waste sectors:

Table 22: Indonesia's INDC in sectoral breakdown

Sectors	Target	Base year	Target year
Forestry	Moratorium on the clearing of primary forests and prohibiting conversion of peat lands	2010	2016
Energy	23% of energy use from new and renewable energy by 2025	n.a.	2025
Waste	Strengthen institutional capacities at the local level and for urban waste water management; to reduce landfill waste and to develop waste-to-energy technologies	n.a.	2020

As for adaptation, Indonesia's INDC notes that the Government of Indonesia has developed a National Action Plan on Climate Change Adaptation and has mainstreamed this into the National Development Plan. Indonesia plans to strengthen institutional capacity and implement its medium-term goal of adaptation strategy to reduce risks on all development sectors (agriculture, water, energy security, forestry, maritime and fisheries, heath, public service infrastructure and urban system) by 2030. The INDC also contains an Annex with Indonesia's **Climate Resilience Strategy**, in which it describes the archipelagic country's vulnerability to the adverse impacts of climate change and the need to strengthen climate resilience by integrating adaptation and mitigation efforts in its development planning and implementation.

Indonesia's INDC describes its planning process, its commitment to institutional development and its enhanced coordination and synergy between the Ministry of Environment and Forestry, the Ministry of National Development Planning (BAPPENAS) and the Ministry of Foreign Affairs in the context of climate change.

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[The full references are included in the bibliography.]

LAO PDR

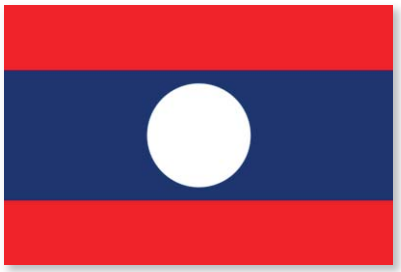

Table 23: Lao PDR national statistics

Country Parameters	2015
GDP per capita (current USD)	1,725
Population (million)	6,492
Population density (people per km^2 of land area)	27
Share of urban population (% of total)	37
Percentage of people under poverty line (%)	30

Source: Lao PDR National Statistics Bureau, 2015

In recent years, Lao PDR has experienced rapid economic growth (7.5% in 2014). The country is also rich in natural resources, but its extensive forest cover has been negatively impacted by deforestation with an estimated average deforestation rate of 1.2 - 1.3% between 1992 and 2002 (The REDD Desk, 2016). Since the livelihood of the majority of the population depends on natural resources, the government aims to promote low-carbon economic development (World Bank, 2014).

In its 8th Five-Year National Socio-Economic Plan (2016-2020) with a Vision to 2030, Lao PDR sets out its long term goal of transiting from a Least Developed Country to a middle income country by 2030, supported by sustainable growth.

Observed and Projected Climate Impacts

The frequency of floods and droughts has increased in the last two decades. In the future, it is expected that precipitation changes will increase the frequency of flooding, while temperature increases will result in more frequent occurrences of disease and water stress. Floods and droughts will negatively impact agricultural lands and production, the main livelihood of the rural poor.

Table 24: Observed and projected changes in temperature and precipitation

	Observed	Projected
Temperature	0.1-0.3 °C increase per decade since 1950	Up to 2.6 °C
Rainfall	Decrease in total rainfall between 1961 and 1998	10-30% increase in the eastern and southern areas

Source: World Bank, 2014

Adaptation Needs

The INDC of the Lao PDR states that the country is highly vulnerable to the impacts of climate change as its "economy and over 70% of its population are dependent on natural resources for their livelihood and food supply"(Lao PDR Ministry of Natural Resources and Environment, 2015, p 5). As a result, Lao PDR has developed a National Adaptation Programme of Action (2009) to address current and future adaptation requirements in the crucial sectors of agriculture, forestry, water and healthcare. Thus, the following needs and programmes are identified in the INDC (Lao PDR Ministry of Natural Resources and Environment, 2015, p 6):

- **Agriculture and forestry:** Promotion of climate resilient management practices and adaptation technologies.
- **Water resources:** Improvements to the information system; promotion of climate resilience in water management practices and in infrastructure development.
- **Transport:** Increasing infrastructure resilience.
- **Healthcare:** Infrastructure and disease control programs.

GHG Emissions

Although latest available UNFCCC data (2000) show that most of Lao PDR's emissions were from LUCF, and that the country was a carbon sink until the early 1990s, LULUCF emissions from WRI data show that emissions keep rising and falling. The maximum value is for 2010 (29.74 MT CO2e) and the next highest value is for 2007 (28.28 MT CO2e). Values for 2011 and 2012 are lower than 2010.

Table 25: Emissions Summary for Lao PDR

Total GHG/CO2 emissions	2000 (UNFCCC)	2011 (World Bank)	2012 (WRI)
CO2 emissions without LUCF (kt)	1,052.20	1,202.77	1,620.00
CO2 net emissions/removals by LUCF (kt)	40,711.80		
CO2 net emissions/removals with LUCF (kt)	41,764.00		
GHG emissions without LUCF (kt)	8,898.20		10,870.00
GHG net emissions/removals by LUCF (kt)	41,919.80		
GHG net emissions/removals with LUCF (kt)	50,818.00		36,280.00
CO2 emissions per capita emissions without LUCF (metric ton)		0.19	0.24

Source: Lao PDR Ministry of National Resources and Environment, 2013; World Bank, 2016 and WRI, 2016

Climate Change Strategic Planning

Lao PDR acceded to the UNFCCC on 4 January 1995 and it entered into force on 4 April 1995. On 6 February 2003, Lao PDR acceded to the Kyoto Protocol and on 16 February 2005, it entered into force.

In line with the national sustainable development objectives, Lao PDR adopted a **Climate Change Strategy** in 2010, focusing on seven key areas in terms of adaptation and mitigation actions. A **National Adaptation Programme of Action (NAPA)** was also developed in 2009, identifying the agriculture, water, health and forestry sectors as the most vulnerable. It also took a strategic approach towards disaster risk management by adopting a **National Disaster Management Plan** for the period 2012-2015. The development of a green economy strategy is also under discussion, since Lao PDR aims to exploit its potential in solar, wind and hydro energy in a variety of sectors.

Lao PDR has also developed strategic action plans for environmental management, environmental education, biodiversity and forestry, water, and land resource management. One such policy is the **Forestry Strategy to the Year 2020** that was finalized in June 2004. The Renewable Energy Development Strategy was adopted in 2011 (Lao PDR, 2011).

A Climate Change and Disaster law is being developed to provide an overarching legal framework for climate change and disaster management. It is expected to be approved in 2017.

Climate Change Institutional Framework

The **National Steering Committee on Climate Change** aims to mainstream climate change into the national development plan and identify priority actions across the seven key areas identified in the National Climate Change Strategy (Lao PDR, 2010). The **National Environment Committee (NEC)** is responsible for the verification of the National GHG Inventory. The Ministry of Natural Resources manages the CDM and Environment (MoNRE), while a separate Task Force and supporting office was created for the REDD+ mechanism.

Climate Change Activities

Lao PDR promotes renewable energy deployment and has supported the implementation of numerous hydropower projects in remote rural areas, which provide low-cost electricity. A variety of adaptation projects have been financed from international sources to develop sectoral strategies, address vulnerabilities, and improve capacities to tackle the climate challenge. The agricultural sector and disaster risk management are priority areas.

Project examples include a Flood Vulnerability Assessment and Mapping Project by the Mekong River Commission, a UNDP-GEF project for Improvement of the Resilience of the Agriculture Sector to Climate Change Impacts, and a Capacity Enhancement for Coping with Climate Change project funded by ADB and the Nordic Development Fund for Community Based Disaster Preparedness Program (2007-2011).

Implementation barriers include the lack of co-ordination between different government levels, the lack of financial and human capacities within government institutions, and low levels of public awareness.

Intended Nationally Determined Contribution

Lao PDR submitted its INDC on 1 October 2015 (Lao PDR Ministry of Natural Resources and Environment, 2015). In the INDC, mitigation activities under forestry, renewable energy, rural electrification, transport and large-scale hydropower are proposed. Examples of activities and objectives in the listed areas are as follows:

Table 26: Lao PDR's INDC in sectoral breakdown

Sectors	Target	Base year	Target year
Energy	Increase renewable energy share to 30% of energy consumption	2011	2025
	Increase large hydro capacity to 5.5 GW by 2020 and further 20 GW by 2030	2015	2030
	Rural electrification programme to 90% of households	2010	2020
Forestry	Increase forest cover to 70% of land area	2000	2020
Transport	Increase share of biofuels to 10% of fuel demand	2011	2025

The INDC also contains a section on adaptation, which highlights the National Adaptation Programme of Action (2009) and the National Strategy on Climate Change (2010) in addressing immediate and projected climate change adaptation requirements in agriculture, forestry, water resources, transport and urban development and public health sectors.

The implementation will be coordinated by a cross-ministerial National Disaster Management Committee (NDMC) and the Ministry of Natural Resources and Environment (MoNRE), which will act as a Secretariat. The INDC's Annex I contains implementation plans, barriers, support required and estimated costs.

Country References Used

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- WRI (2016) CAIT Climate Data Explorer

[The full references are included in the bibliography.]

MALAYSIA

Table 27: Malaysia's national statistics

Country Parameters	2014
GDP per capita (current USD)	11,307.00
Population (million)	29.90
Population density (people per km^2 of land area)	91.00
Share of urban population (% of total)	74.00
Percentage of people under poverty line (%)	0.60

Source: UNSD, 2014 and World Bank, 2014b

Malaysia experienced steady economic and population growth over the last decade. These trends, along with high population densities and high levels of urbanization, have put growing pressure on the country's natural resources and rich biodiversity.

Observed and Projected Climate Impacts

The total amount of rainfall has not increased noticeably, but rain storms have become more intense and are expected to further intensify and result in more extreme weather changes in the future. Sea levels have been rising, with a 1.3 mm annual increase observed during the 1986-2006 period. By 2050 a 0.5m total rise is expected (Malaysia, Ministry of Natural Resources and Environment, 2011).

Table 28: Observed and projected changes in temperature and precipitation

	Observed	Projected
Temperature	0.6-1.2 °C increase since 1969	1.5-2 °C increase by 2050
Rainfall	No noticeable increase	More intense rainfalls
Sea-level rise		1m by 2100

Source: World Bank, 2014; Government of Malaysia, 2015

Malaysia is especially vulnerable to increased water stress and sea level rise. In the second National Communication to the UNFCCC (2011), it identified 6 main priority adaptation areas. These comprise extreme weather events including droughts and floods, agriculture production losses, human health problems, biodiversity, and coastal and marine habitat losses.

Adaptation Needs

Malaysia's INDC identifies its adaptation needs, having experienced increased surface mean temperature increase over the last five decades (Government of Malaysia, 2015). Malaysia aims to build

resilience and to mainstream adaptation to climate change into its development plans. The INDC notes Malaysia's intention to develop a national adaptation plan *"to provide greater coordinated implementation" (ibid p.4).*

According to the Adaptation Knowledge Platform (2011) and Malaysia's INDC (2015), priority areas for adaptation include:

- **Flood Risks:** Mitigating annual direct loss from monsoon and flash floods, strengthen disaster risk management and resilience of infrastructure, revision of flood management plans, improved rainfall and flood forecasting, disaster warning systems, and flood hazard mapping.
- **Water Security:** Management of vital water catchment areas, strengthen the regulatory framework of the water services industry, expand the water supply network and treatment capacity infrastructure in order to enhance water supply efficiency, demand management practices.
- **Food Security and Agriculture:** Improve agriculture and agro-based industries, expand implementation of good agricultural practices, intensify research and development for improving agriculture production, efficient irrigation and draining infrastructure improvements.
- **Coastlines:** Develop hard and soft engineering approaches and implement the Integrated Shoreline Management Plans.
- **Biodiversity:** Create conservation and protection corridors, protection of genetic resource via gene banks, and rehabilitation centers for fauna.
- **Health:** Implement surveillance programmes and detection mechanisms for vector and waterborne diseases, and community involvement in defense strategies, disaster management systems.

GHG Emissions

While Malaysian forests were still major carbon sinks in 2000, based on emission estimations, Malaysia became a net emitter by 2005 (see WRI calculations for 2012). By 2012, the CO2 emissions per capita were above the level of other countries in the region, but still below the global average.

Table 29: Emissions summary for Malaysia

Total GHG/CO2 emissions	2011 (UNFCCC)	2011 (World Bank)	2012 (WRI)
CO2 emissions without LUCF (kt)	208,256	225,693	207 860
CO2 net emissions/removals by LUCF (kt)	-260,457		
CO2 net emissions/removals with LUCF (kt)	-52,201		
GHG emissions without LUCF (kt)	290,230		288,130
GHG net emissions/removals by LUCF (kt)	-262,946		
GHG net emissions/removals with LUCF (kt)	27,282		433,330
CO2 emissions per capita emissions without LUCF (metric ton)	9.888	7.9	7.11

Source: UNFCCC, 2014b; World Bank, 2014, WRI, 2014; Government of Malaysia, 2016

Climate Change Strategic Planning

Malaysia signed the United Nations Framework Convention on Climate Change (UNFCCC) on 9 June 1993 and ratified it on 17 July 1994. It ratified the Kyoto Protocol on 4 September 2002 and it entered into force on 16 February 2005.

Malaysia recognised sustainable development as one of the three main pillars of the New Economic Model (2010). In line with this, the government advocates a holistic approach to deal with climate change and considers green technology deployment as key to sustainable development. The 10th Malaysia Plan (2011-2015) focused on sustainable growth and introducing mitigation strategies to reduce GHG emissions. The 11th Malaysia Plan (2016-2020) defines the country's aspiration to become an inclusive and sustainable nation by 2020 and emphasises the importance of green growth for protecting the environment and securing development. (Government of Malaysia, 2015a).

The government developed and approved the **National Policy on Climate Change and the Green Technology Policy** in 2009 to provide a comprehensive framework for addressing climate change and promoting low-carbon development. In 2009, Malaysia also pledged to reduce its emissions intensity by up to 40% by 2020 (compared to 2005). It also adopted legislation related to renewable energy in 2011. In 2014, a **Roadmap of Emissions Intensity Reduction** in Malaysia was published, presenting various sectoral measures that can support the country in reaching the 40% emissions intensity reduction target of the country (Government of Malaysia, 2015b).

Climate Change Institutional Framework

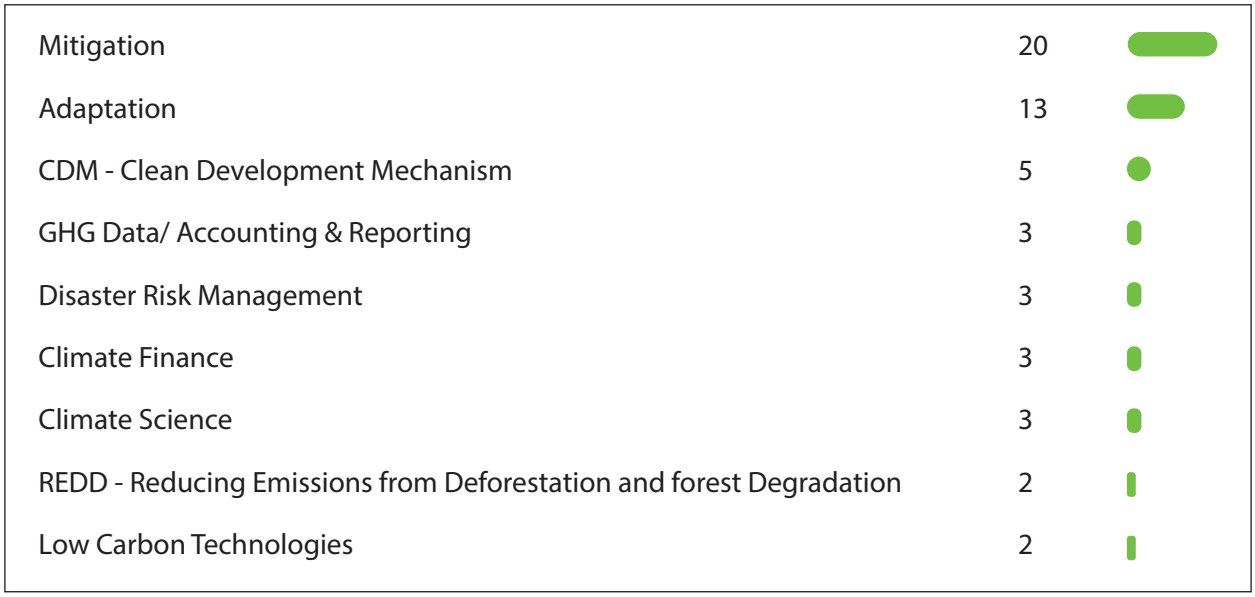
The Ministry of Energy, Green Technology and Water and the Ministry of Natural Resources and Environment are both involved in climate activities (green technology development and adaptation measures, respectively). The Ministry of Natural Resources and Environment is also responsible for the REDD+ programme. Led by the Prime Minister, the **National Green Technology and Climate Change Council** was established in 2010 to co-ordinate implementation of the Climate and Green Technology strategies. In 2011, a statutory body called the Sustainable Energy Development Authority was established to co-ordinate the implementation of the feed-in tariff mechanism, mandated under the Renewable Energy Act 2011 (Sustainable Energy Development Authority Portal, 2011).

A variety of NGOs and associations also function in Malaysia, such as the Business Council on Sustainable Development Malaysia, the Malaysia Environmental NGOs (MENGO), the Environmental Protection Society of Malaysia, and the Malaysian Youth Climate Justice Network.

Climate Change Activities

Since 2007, Malaysia has implemented various mitigation and adaptation programmes in 17 different sectors. Measures to improve public awareness and build infrastructure (especially for water resources) are considered of strategic importance. Agriculture and food security, as well as public health measures, are also prioritised. As for mitigation, renewable energy investments, especially in solar energy, are promoted.

Figure 20: Number of climate projects and activities in Malaysia



Source: Southeast Asia Network of Climate Change Offices, 2016

Malaysia aimed to promote sustainability measures through the use of three financial tools. Firstly, a feed in-tariff mechanism (FiT) was formulated simultaneously with the **Renewable Energy Policy and Action Plan** (2010) in order to fund renewable energy projects. Other measures included providing fiscal incentive and support for investments in green technology as well as projects eligible for carbon credits. Moreover, **the Central Forest Spine (CFS)** and the **"Heart of Borneo"** initiatives were introduced in the forestry sector with a goal of encouraging sustainable forest management practices and sustainable use of natural resources.

In 2012, The Ministry of Environment, Green Technology and Water published the Low **Carbon Cities Framework and Assessment System** to provide cities and urban settlements with direction and technical guidance towards reducing their carbon emissions (Kementerian Tenaga, Teknologi Hijau dan Air, 2012).

However, several implementation challenges remain and these include insufficient institutional coordination, institutional capacity, public participation, and monitoring mechanisms.

Intended Nationally Determined Contribution

Malaysia submitted its INDC on 27 November 2015. The INDC states Malaysia's intention to *"reduce its greenhouse gas (GHG) emissions intensity of GDP by 45% by 2030, relative to the emissions intensity of GDP in 2005. This consists of 35% on an unconditional basis and a further 10% conditional upon receipt of climate finance, technology transfer and capacity building from developed countries"* (Government of Malaysia 2015, p.1).

The gases covered include carbon dioxide, methane and nitrous oxide, and the coverage is economy-wide in the energy, industrial processes, waste, agriculture and land use and land use change and forestry (LULUCF).

The INDC notes that Malaysia took early action by introducing climate mitigation measures via its 9th and 10th national development plans (from 2006 onwards) and will continue to aim for green growth via its 11th national development plan (*ibid* p.1).

In terms of adaptation, Malaysia plans to develop an adaptation plan to provide greater coordinated implementation. In particular, susceptibility to seasonal monsoon floods, water and food security, coastline erosion and public health were identified.

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[The full references are included in the bibliography.]

MYANMAR

Table 30: Myanmar's national statistics

Country Parameter	2014
GDP per capita (current USD)	1,203
Population (million)	51.48
Population density (people per km2 of land area)	76.10
Share of urban population (% of total)	30
Percentage of people under poverty line	n.a.

Source: UNSD, 2014; World Bank, 2014 and Myanmar Census Report vol 2, 2015

Myanmar has experienced rapid economic growth since 2010. The economy is primarily based on agricultural production, with the livelihood of the rural population largely dependent on natural resources.

Observed and Projected Climate Impacts

Myanmar has become highly vulnerable to climate change over the last six decades (GLOBE, 2015). Observed climate change impact include an increase in temperature, total precipitation, a shorter south-west monsoon season and increased occurrence of extreme weather events (Chit, O. K. & Soe, M. M., 2015).

Future effects of climate change in Myanmar are expected to vary by regions, seasons and different climate scenarios. Climate risks include increased frequency of extreme weather events, flood and storm surges, more intense rainfall, extreme daytime temperatures, drought and sea level rise.

Table 31: Observed and projected changes in temperature and precipitation

	Observed	Projected
Maximum Temperature	1.2 °C increase between 1981-2010	1.3 – 2.0°C increase by 2060 and 1.9 – 2.6 °C by 2100
Minimum Temperature	0.5 °C increase between 1981-2010	1.4 – 2.0°C increase by 2060 and 2.1 – 2.7°C by 2100
Rainfall	11% increase between 1981- 2010	5 – 10% increase by 2060 and 19 – 36% by 2100

Source: New Climate Change Projection by DMH

Agriculture, water resources, public health, forests, coastal zones, and biodiversity are identified as the sectors most prone to climate change.

Adaptation Needs

In Myanmar, the most prioritized adaptation sectors include agriculture, forestry, disaster risk reduction, public health, and water resources. Necessary adaptation actions are as follows (World Bank, 2014):

- **Agriculture:** Crop diversification and climate-resilient varieties, and diversification of production.
- **Disaster risk reduction:** Improved weather observation capacity, flood and drought early warning systems, and assessment of the hydrological impact of climate change on river systems.
- **Forests:** Reforestation, community reforestation in watershed areas, and community-based mangrove restoration.
- **Public health:** Climate-resilient health facilities, prevention of heat-related disorders in agricultural and industrial sectors, Intensive Care Units (ICU) in hospitals to treat heat-related disorders, and safe water supplies and sanitary latrines.
- **Water resources:** Assessment of the status of dams and regional rainfall-runoff relationships, construction of small-scale water impoundments, channel improvements, and adaptation.

GHG Emissions

According to the latest available UNFCCC data (for 2000), Myanmar is a carbon sink, with total net GHG and CO2 emissions removal. The CO2 emissions have not increased radically in the recent years: in 2011 CO2 emissions per capita were 0.2 metric tons (World Bank, 2011).

Table 32: Emissions summary for Myanmar

Total GHG/CO2 emissions	2000 (UNFCCC)	2011 (World Bank)	2012 (WRI)
CO2 emissions without LUCF (kt)	8 264.6	10,440	11 740
CO2 net emissions/removals by LUCF (kt)	-95 774.7		
CO2 net emissions/removals with LUCF (kt)	-87 510.1		
GHG emissions without LUCF (kt)	38 374.9		98 930
GHG net emissions/removals by LUCF (kt)	-95 774.7		
GHG net emissions/removals with LUCF (kt)	-57 399.8		184 710
CO2 emissions per capita emissions without LUCF (metric ton)		0.2	0.22

Source: Republic of the Union of Myanmar, 2012; World Bank, 2016 and WRI, 2016

Climate Change Strategic Planning

Myanmar signed the UNFCCC on 11 June 1992, ratified it on 25 November 1994. The UNFCCC entered into force on 23 February 1995. Myanmar later acceded to the Kyoto Protocol on 13 August 2003, which entered into force on 16 February 2005.

Myanmar has mainstreamed green economy and climate change considerations into its latest national development strategies, e.g. in the **National Comprehensive Development Plan for 2011-30**. In 2012 it also adopted an **Environmental Conservation Law** and developed its **National Adaptation Programme of Action** (NAPA). The Programme defines 5 strategic objectives including mitigating GHG emissions, adapting to climate change, developing underlying policies and plans, supporting climate research, and mainstreaming climate objectives into national development plans. An inter-ministerial task force also prepared the **Myanmar Action Plan on Disaster Risk Reduction for 2009-2015**.

Myanmar is currently developing a National Climate Change and a Green Economy Strategy and underlying action plans. In 2016 it is also planning to develop a National Adaptation Plan (Republic of the Union of Myanmar, 2015). The government is also developing a **Long-Term Energy Master Plan** and a **National Electrification Plan** and aims reduce energy consumption (by 5% and 8%, respectively, to 2020 and 2030); to improve energy efficiency by 16% to 2030 and promote renewable energy use by 15% to 2020 (GLOBE, 2015b).

Myanmar aims to reduce energy consumption by 5% by 2020 and 8% by 2030, from 2005 levels. It also aims to improve energy efficiency by 16% in all sectors by 2030.

Climate Change Institutional Framework

The **National Environmental Conservation Committee** had been the primary coordinator of implementation of environmental objectives since 2011. The Ministry of Environmental Conservation and Forestry and the Ministry of Foreign Affairs were responsible for the UNFCCC negotiations. The Ministry of Environmental Conservation and Forestry was also responsible for tackling deforestation and promoting afforestation (i.e. REDD task force, where a Dry Zone Greening Department was also established). In 2013, a National Energy Management Committee was established to develop energy policies and plans for the country and to co-ordinate the development of the energy-sector (GLOBE, 2015).

In 2013, with the support of the EU, the Myanmar Climate Change Alliance was established within the Ministry of Environmental Conservation and Forestry.

In 2016, the **National Environmental Conservation and Climate Change Committee** was formed by the new government with the leadership of the Vice President as honorable chair. All the environmental and climate change concerned Ministries are involved in the committee and the Ministry of Natural Resources and Environmental Conservation takes a focal role and serves as a secretary of the committee. The regional and state level committees are organized under the national committee.

The activities of the NGO sector have also increased in recent years, mainly in forest rehabilitation, environmental conservation, and climate change mitigation and adaptation.

Climate Change Activities

Myanmar has implemented various climate activities to date, but considers reforestation as its main priority. An example for REDD+ activities is a reforestation project in the Bago Yoma Region, financed by the Republic of Korea.

Mitigation activities include rural electrification, renewable energy promotion, and decreasing the emissions from the agricultural sector. Adaptation efforts target the agriculture and forest sector, development of early warning systems, improvement of public health, improvement of water resource management and protection of coastal zones.

Implementation challenges comprise public and private financing constraints, insufficient governmental presence and coordination, lack of emissions data, insufficient promotion of renewable energy and energy efficiency measures in specific sectors (e.g. for industries), and lack of human and technical capacities.

Intended Nationally Determined Contribution

Myanmar submitted its INDC on 28 September 2015. The INDC was prepared with political guidance from the highest institutional level within the Government of the Republic of the Union of Myanmar. The Ministry of Environmental Conservation and Forestry (MOECAF) acted as the INDC focal point, facilitating input from other ministries.

Myanmar's INDC contains a mitigation contribution based on actions in the forestry and energy sectors. These are listed below:

Table 33: Myanmar's INDC in sectoral breakdown

Sectors	Target	Base year	Target year
Energy	Increase share of hydro to 9.4 GW	n.a.	2030
	Increased rural electrification through 30% renewable energy	n.a.	2030
	Realize 20% electricity saving potential of the total forecast electricity consumption	n.a.	2030
	Distribute 260,000 energy efficient cookstoves	n.a.	2030
Forestry	Reserved Forest (RF) and Protected Public Forest (PPF) areas to cover 30% of total national land area	n.a.	2030
	Protected Area Systems (PAS) to account for 10% of total national land area	n.a.	2030

The forestry targets are intended to be implemented in the 30-Year National Forestry Master Plan (2001-30). Collaborations with the UN-REDD Programme and European Union's Forest Law Enforcement Governance Trade Programme are among the efforts to implement underlying actions.

The INDC also has an adaptation section which describes the country's vulnerability to climate change, climate variability and natural disasters. Adaptation to the changing climate is a priority. However, the capacity to reduce risk and mitigate the effects of climate change is limited due to lack of technical, human resources, financial and legislative processes. This results in significant loss and damage, hampering the process of national development. The INDC covers Myanmar's priorities for adaptation in the agriculture, public health, water, energy and industry sectors, as well as for biodiversity and coastal zones. It outlines current and planned adaptation efforts at the policy, legal and programme level.

National Climate Change Strategy and Action Plans (NCCS&APs)

With the support of the Myanmar Climate Change Alliance (MCCA), a National Climate Change Strategy and Action Plan has been developed since April 2015. The goal of the strategy is that "Myanmar implements a climate resilient and low-carbon development pathway by 2030 to achieve inclusive and sustainable development. It has 2 main objectives: 1) To increase adaptive capacity of vulnerable communities and sectors so that they are resilient to the impacts of climate change; and 2) To maximise

opportunities for sectors to follow a low carbon development pathway ensuring benefits to all, household and economy, focusing on 6 thematic areas.

These are: i) Climate smart agriculture, fishery, livestock, food and livelihood security; ii) Healthy eco-system services and sustainable management of the environment; iii) Sustainable energy, transport and industrial systems; iv) Resilient and sustainable cities and buildings; v) Resilient society through disaster risk reduction and health; and vi) Climate responsive society through education, awareness, science and technology. The objectives will be met through six prioritized actions. The priority actions will be establishment of a policy framework, strengthening of institutional mechanisms, establishment of financial frameworks, access to technology, improvement of awareness and capacity, education, research, data, and innovation, and promotion of multi-stakeholder partnerships.

The National Climate Change Strategy (NCCS) and Action Plan (AP) will be validated by 2016.

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[The full references are included in the bibliography.]

PHILIPPINES

Table 34: The Philippines' national statistics

Country Parameters	2014
GDP per capita (current USD)	2,872
Population (million)	99.138
Population density (people per km2 of land area)	332.5
Share of urban population (% of total)	44
Percentage of people under poverty line (%)	25.2*

**Data is for 2012*
Source: UNSD, 2014 and World Bank, 2014b

The Philippines has experienced strong economic growth in recent years. However, its socio-economic development is heavily affected by various extreme weather events and natural disasters, and is considered as one of the most climate change- and disaster-prone countries.

Observed and Projected Climate Impacts

Major future climate impacts include increased temperature, landslides, and floods, tropical cyclones, and decreased rice yield. It is also expected that the more frequent occurrence of El Niño will increase droughts. Sea level is projected to rise by 0.35m by 2090-2100. Heavy rainfall and typhoons are likely to intensify due to rising sea surface temperatures.

Table 35: Observed and projected changes in temperature and precipitation

	Observed	Projected
Temperature	+0.3°C per decade between 1971-2000 in the South Pacific	0.9°C to 1.1°C by 2020 and 1.8°C to 2.2°C by 2050 under the A1B scenario.
Rainfall	Number of rainy days and tendency for heavy rainfall increased since 1990	Increased seasonal variation (-39.8% to 72.5%) under the A1B scenario.

Source: World Bank, 2014; IACCC, Philippines, 2014

Droughts will negatively impact agricultural production and food security, and thus economic development.

Adaptation Needs

The Philippines prioritises adaptation actions in the agriculture sector, and in watersheds and coastal areas, and in the area of human health:

- **Agriculture and food security:** Initiatives to reduce the vulnerability of rice production such as using drought resistant varieties, improved irrigation and fertilization, and use of other post-harvest facilities; along with other initiatives such as providing weather based insurance, use of GIS technology to match soil type with crops, and modifying subsidies for seeds, fertilizers etc.
- **Watersheds:** Rehabilitation of degraded areas through reforestation and facilitating natural regeneration.
- **Coastal areas:** Research on salt water intrusion impacts, implementing the Integrated Coastal Management program, and large scale reforestation including mangroves.
- **Health:** Early warning systems for heat waves and other extreme events, climate proof housing development, and improved surveillance of disease outbreaks and related indicators such as mosquito numbers.

GHG Emissions

The latest available UNFCCC GHG emissions data is for 2000. According to the World Bank and WRI calculations (2011 and 2012), there has been a 50% increase in the CO2 and GHG emissions, while the per capita CO2 emissions is still low (0.91 metric tons in 2011).

Table 36: Emissions Summary for the Philippines

Total GHG/CO2 emissions	2000 (UNFCCC)	2011 (World Bank)	2012 (WRI)
CO2 emissions without LUCF (kt)	57 932	82 012	87 830
CO2 net emissions/removals by LUCF (kt)	-2 774		
CO2 net emissions/removals with LUCF (kt)	55 158		
GHG emissions without LUCF (kt)	100 866.6		159 230
GHG net emissions/removals by LUCF (kt)	-126.5		
GHG net emissions/removals with LUCF (kt)	100 740.1		157 590
CO2 emissions per capita emissions without LUCF (metric ton)		0.86	0.91

Source: UNFCCC, 2014; World Bank, 2016 and WRI, 2016

Climate Change Strategic Planning

The Philippines signed the UNFCCC on 12 June 1992 and ratified it on 2 August 1994. The Convention came into force on 31 October 1994. Subsequently, the Philippines signed the Kyoto Protocol on 15 April 1998, ratified it on 20 November 2003 and it entered into force on 16 February 2005.

In 2009, the Philippines passed the **Climate Change Act**, which established the Climate Change Commission (CCC) to lead policy development and coordinate, monitor and evaluate climate responses. An amendment of this law also led to the introduction of the Peoples' Survival Fund allocating national budget for adaptation needs of local communities and local governments in 2012.

The CCC developed the **National Framework Strategy on Climate Change** (NFSCC) (2010), which laid the foundation and roadmap for addressing climate change. The issuance of the **National Climate Change Action Plan** (2011) set the direction for concrete mitigation and adaptation actions for 2011–28.

Various legislations targeting renewable energy development have been enacted, including the Renewable Energy Act of 2008 and the Biofuels Act of 2008. The Philippines has also committed to a 5% voluntary emission reduction target by 2012 (compared to 1990 levels). In addition, the Philippine Energy Plan aims for a 10% reduction in energy consumption by 2028.

Climate Change Institutional Framework

Chaired by the President of the Republic, the **Climate Change Commission** is responsible for developing, coordinating, monitoring, and evaluating climate change strategies and programmes. A cross-sectoral advisory board from government agencies, local governments, academia, business and NGOs support the activities of the Commission.

The **Cabinet Cluster on Climate Change Adaptation and Mitigation** has also been created to improve coordination among government agencies involved in adaptation and mitigation activities.

Climate Change Activities

The Philippines implements both mitigation and adaptation actions for food, water and human security, ecological and environmental stability, green industries and services, sustainable energy, and knowledge and capacity development.

Figure 21: Number of climate projects and activities in the Philippines, by theme

Source: Southeast Asia Network of Climate Change Offices, 2016

Project examples include the implementation of the Low-Cost Warning System for Flood/Slide-Prone Communities; the preparation of a National Wetlands Action Plan, and extensive national education programmes for schools and local authorities.

The main implementation challenge is the extreme diversity of the archipelago, which makes the adoption of a homogeneous strategy difficult.

Intended Nationally Determined Contribution

The Philippines submitted their INDC on 1 October 2015. The Philippines intends to reduce its GHG emissions by approximately 70% as compared to emissions under a BAU scenario by 2030 (Republic of the Philippines, 2015). Energy, transport, waste, forestry and industry sectors will contribute towards achieving the emission reductions. The achievement of mitigation contributions will be contingent on the extent of support, including technology development & transfer, and capacity building, that will be made available.

The INDC emphasises the Philippines' vulnerability to the impacts of climate change and highlights priority measures that would need implementation support. These include strengthening institutions for climate modelling and monitoring; including climate risk and vulnerability in development plans and projects; development of climate resilience in agriculture, water and healthcare; and further research on climate change impacts.

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- WRI (2016) CAIT Climate Data Explorer

[The full references are included in the bibliography.]

SINGAPORE

Table 37: Singapore's national statistics

Country Parameters	2014
GDP per capita (current USD)	56,284
Population (million)	5.470
Population density (people perkm2 of land area)	7,736.5
Share of urban population (% of total)	100
Percentage of people under poverty line	N/A

Source: UNSD, 2014 and World Bank, 2016

Singapore is a small, densely-populated urban city state. It relies heavily on external energy sources, given its alternative energy constraints. In addition, its growth puts increasing pressure on its limited natural resources and the ecosystem.

Observed and Projected Climate Impacts

Singapore has undertaken two National Climate Change Studies to better understand the potential impact of climate change on the country. The first study was completed in 2013 and was based on the data and scenarios from the IPCC AR4.

The second study updated the projections for Singapore, based on the data and scenarios from the IPCC AR5. Phase 1 of the study was completed in 2015 and its findings were consistent with those from the IPCC AR5, which predicted global sea level rise, as well as higher temperatures and more extreme rainfall. For Singapore, it is predicted that the long-term effects of climate change would lead to a temperature increase of 1.4°C to 4.6°C and a rise in mean sea level of 0.25m to 0.76m for the period of 2070-99 (relative to 1980-2009).

Table 38: Observed and projected changes in temperature and precipitation

	Observed	Projected
Temperature	Annual average temperature has increased from 26.6 to 27.7°C from 1972 to 2014	1.4 to 4.6 °C increase in daily mean temperature for the period of 2070 – 2099 (relative to 1980-2009)
Rainfall	General uptrend from 2192 mm in 1980 to 2727 mm in 2014	Increasing trends in both intensity and frequency of heavy rainfall events
Sea-level rise	Rose at a rate of 1.2–1.7 mm yr−1 in the period 1975-2009	+0.25 to +0.76 m for the for the period of 2070 – 2099 (relative to 1980-2009)

Source: Centre for Climate Research Singapore, 2015

Adaptation Needs

As a low-lying and densely populated island city-state, Singapore is particularly vulnerable to the impacts of climate change. It is therefore important for Singapore to prepare for and adapt to climate change. Singapore's public sector has taken the lead on this by developing a range of climate change adaptation measures to protect its coastal areas, manage water supply and minimize floods, protect biodiversity and greenery, strengthen resilience in public health and food supply, keep essential services running well as well as keep its buildings and infrastructure safe.

GHG Emissions

According to the latest available climate information, Singapore had per capita emissions of 4.3 metric tons in 2011. It must be noted, however, that as an island country, nearly all of its fuel and energy is imported from nearby countries.

Table 39: Emissions summary for Singapore

Total GHG/CO2 emissions	2010 (UNFCCC)	2011 (World Bank)	2012 (WRI)
CO_2 emissions without LUCF (kt)	45,202.88	22,394.00	49,750.00
CO_2 net emissions/removals by LUCF (kt)			
CO_2 net emissions/removals with LUCF (kt)			
GHG emissions without LUCF (kt)	46 831.68		56,120.00
GHG net emissions/removals by LUCF[48] (kt)			
GHG net emissions/removals with LUCF (kt)			56,130.00
CO_2 emissions per capita emissions without LUCF (metric ton)		4.3	9.36.00

Source: Singapore National Environment Agency, 2014; World Bank, 2016 and WRI, 2016

Climate Change Strategic Planning

Singapore signed the UNFCCC on 13 June 1992, ratified it on 29 May 1997. The UNFCCC entered into force on 27 August 1997. Singapore acceded to the Kyoto Protocol on 12 April 2006, which entered into force on 11 July 2006.

In 2016, Singapore released its **Climate Action Plan** titled Take Action Today, for a Sustainable Future, which contains information on how Singapore intends to reduce greenhouse gas emissions and increase energy efficiency to meet its 2030 climate pledge. The second publication, A Climate-Resilient Singapore, for a Sustainable Future, explains how Singapore may be affected by climate change and its strategy to prepare for them.

The **Sustainable Singapore Blueprint**, issued in 2009 and updated in 2014, outlines Singapore's national vision and plans for a more livable and sustainable Singapore. These plans include initiatives to reduce our carbon emissions, reduce resource consumption, grow a greener economy, adapt to climate change effects, and participate in multilateral efforts.

[48] *Singapore has begun a long-term programme to monitor and report carbon storage and carbon fluxes related to land use change and forestry. Given Singapore's small land size and highly urbanized landscape, the greenhouse gas emissions from land-use change and forestry sectors are anticipated to be small in comparison with the size of carbon stocks and in comparison with other economic sectors.*

The 2030 targets laid out in the Sustainable Singapore Blueprint show Singapore's ambition in practicing sustainable development. These include a target of a 35% energy efficiency improvement by 2030 (from 2005 levels). To promote this objective, an **Energy Conservation Act** was introduced in 2013 to regulate large-scale energy consumers. Within the NAMA framework, Singapore has also pledged to reduce its greenhouse gas emissions by 16% from business-as-usual levels by 2020. The National Climate Change Strategy was published in 2012 and covers both mitigation and adaptation aspects.

Climate Change Institutional Framework

Under the Prime Minister's Office, the **National Climate Change Secretariat** (NCCS) was established in 2010 to co-ordinate the implementation of climate activities with public and private organizations. The NCCS is also secretariat to the **Inter-Ministerial Committee on Climate Change** (IMCCC), which oversees the work of three working groups. The International Negotiations Working Group (INWG) develops Singapore's international climate change negotiations strategy under the UNFCCC. The Long-Term Emissions and Mitigation Working Group (LWG) examines options to stabilise Singapore's long-term emissions and identifies the capabilities, infrastructure and policies needed for long-term mitigation. The Resilience Working Group (RWG) studies Singapore's vulnerability to the effects of climate change and recommends long-term plans that ensure the nation's adaptation to future environmental changes.

Climate Change Activities

Singapore finances its own green initiatives and undertakes a variety of activities. Research and investment is prominent in solar energy deployment and Singapore has plans to increase the adoption of solar power to 350MWp by 2020. Energy efficiency and clean energy deployment have also increased by introducing market competition in the energy sector. To assist industrial sites increase their energy performance, there are a suite of incentives and grants, mandatory energy management requirements under the Energy Conservation Act, and capability building training, workshops and resources.

Besides industry, energy efficiency and savings measures are also promoted in the public transport, building, and household sectors. As part of the Energy Innovation Challenge, Singapore commissioned seven technology roadmaps to discuss potential pathways for research and deployment in the following sectors: solar photovoltaic, building energy efficiency, energy efficient data centers, industrial energy efficiency, and carbon capture, storage and utilization (CCSU),[49] electro-mobility, and solid waste management.

The main implementation challenge in achieving clean energy deployment is the limited renewable development capacity of the country, due to its small size.

Singapore also developed a range of climate change adaptation measures, designed with the protection of Singapore and Singaporeans in mind. These aim to minimize the adverse effects that climate change could have on the community, economy, and daily lives of Singaporeans. In order to protect its coastal areas, Singapore has required all new reclaimed land to be reclaimed to a higher level and has raised some coastal roads. To manage its water needs, Singapore has diversified its water sources and built desalination and NEWater plants, which are less weather dependent. To safeguard biodiversity and greenery, Singapore has set up coastal and marine protected areas. In terms of the public health effects of climate change, Singapore has taken steps to reduce the risk of vector-borne diseases such as dengue. Moreover, Singapore is diversifying its food supply and is encouraging research to improve its food security. In addition, to keep essential services running well, strict codes and performance standards are being developed. Buildings, rail and road infrastructure are already subject to strict regular inspection and maintenance.

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[49] *More information available at Singapore National Research Foundation (2016) Singapore's Energy Technology Roadmaps..URL:www.nrf.gov.sg/about-nrf/programmes/national-innovation-challenges/energy-technology-roadmaps*

Intended Nationally Determined Contribution

Singapore submitted its INDC to the UNFCCC on 3 July 2015. The INDC stated Singapore's intention to reduce its emissions intensity by 36% from 2005 levels by 2030, and to stabilise emissions with the aim of peaking around 2030 (Singapore National Climate Change Secretariat, 2015 p.1). This builds on Singapore's pledge in 2009 to reduce its emissions by 16% below business-as-usual levels (BAU-16%) by 2020 if there is a legally binding global agreement. (Singapore National Climate Change Secretariat, 2015 p.1).

Singapore described its commitment as a stretch target, given constraining factors such as its early actions it took to develop in a sustainable manner and its limited access to alternative energy options. Singapore's INDC is not conditional on external support.

The INDC contains an Annex with accompanying information on Singapore's national circumstances and adaptation efforts. Singapore underscored its national conditions as being alternative energy-disadvantaged and highlighted the efforts it has taken and is currently taking to ensure carbon efficiency. This includes not subsidising energy costs, strong pollution control laws to encourage industries to switch to cleaner fuel sources such as natural gas, and the adoption of energy efficiency technologies through grants and other policy tools. Regarding adaptation efforts and challenges, it identifies key adaptation measures that Singapore is undertaking in the field of food security; infrastructure resilience; public health; flood risk management; water security; coastline protection; biodiversity protection and regional climate modeling.

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[The full references are included in the bibliography.]

THAILAND

Table 40: Thailand's national statistics

Country Parameters	2014
GDP per capita (current USD)	5,977.4
Population (million)	67.73
Population density (people per km2 of land area)	132.6
Share of urban population (% of total)	49
Percentage of people under poverty line (%)	10.5

Source: UNSD, 2014 and World Bank, 2014b

Thailand's economy has been rapidly growing, but climate change could seriously affect the country's future growth potential. The agricultural sector, which provides the livelihood of 40% of the population, and the country's 2,600km coastline – an ecosystem that is highly important to the socio-economic development of the country – are especially vulnerable to climate impacts (World Bank, 2014).

Observed and Projected Climate Impacts

Table 41: Observed and projected changes in temperature and precipitation

	Observed	Projected
Temperature	0.1-0.2 °C per decade since 1960	1.7 to 2.1 °C increase by 2045-2065
Rainfall	Variability has been large, both within a year and between years	-109 to 76 mm change by 2045 -2065

Source: World Bank, 2014

In the future, increased occurrence of droughts and floods are expected due to fluctuating rainfall and increasing level of sea surface water. The agriculture sector, especially maize and rice production, may be heavily impacted by climate change. Sea-level rise will negatively affect coastal ecosystems. Public health will be impacted by enhanced potential spread of malaria and dengue disease. The type and structure of forests, forest ecosystems, and the biological diversity of the fauna and flora can also be affected by climate change.

Adaptation Needs

Thailand has identified the following adaptation needs in its key sectors (Thailand Office of Natural Resources and Environmental Policy and Planning, 2015):

- **Agriculture and food security:** Promotion of sustainability agricultural and land use practices.
- **Water resource use:** Integrated Water Resource Management; infrastructure improvements; flood and drought risk management.
- **Forests and biodiversity:** Introduction of community forest management practices; restoration of protected areas and coastal areas; climate proofing of coastal infrastructures; promotion of sustainable tourism.
- **Disaster risk management:** Increase awareness about disasters and improve management of disasters; early warning systems and improved technologies for risk assessments.

GHG Emissions

Thailand almost doubled its CO2 emissions between 2000 and 2010. Its per capita CO2 emissions rose to 4.53 metric tons in 2011.

Table 42: Emissions summary for Thailand

Total GHG/CO_2 emissions	2011 (UNFCCC)	2011 (World Bank)	2012 (WRI)
CO_2 emissions without LUCF (kt)	228,449	303,370.91	273,090
CO_2 net emissions/removals by LUCF (kt)	-114,127		
CO_2 net emissions/removals with LUCF (kt)	157,019		
GHG emissions without LUCF (kt)	305,523		375,700
GHG net emissions/removals by LUCF (kt)	-114,127		
GHG net emissions/removals with LUCF (kt)	234,584		375,710
CO_2 emissions per capita emissions without LUCF (metric ton)		4.53	

Source: Thailand Office of Natural Resources and Environmental Policy and Planning, 2015b; World Bank, 2016 and WRI, 2016

Climate Change Strategic Planning

Thailand signed the UNFCCC on 12 June 1992 and ratified it on 28 December 1994. The Convention entered into force on 28 March 1995. Later, Thailand signed the Kyoto Protocol on 2 February 1999 and ratified it on 28 August 2002. The Protocol came into force on 16 February 2005.

Thailand introduced the "Sufficiency Economy" principle, which considers moderation in co-existence with nature as a way to tackle climate change. Thailand also has a long-term, **National Master Plan on Climate Change 2015-2050**[50] and a short-term strategy for 2008-2012 (GLOBE, 2015). Following a World Bank-supported study of the Bangkok Metropolitan Region, the country initiated a city-level climate action plan for the nation's capital. The **Bangkok Metropolitan Administration (BMA) Action Plan on Global Warming Mitigation 2007-2012** comprises 5 major initiatives; namely 1) Expand Mass Transit and Improve Traffic System; 2) Promote the Use of Renewable Energy; 3) Improve Building Electricity Consumption Efficiency; 4) Improve Solid Waste Management and Wastewater Treatment Efficiency; and 5) Expand Park Areas. The Action Plan was aimed at reducing greenhouse gas emissions by approximately 15% of the total emission anticipated in the year 2012, under a business-as-usual

[50] *The Master Plan on Climate Change (2015–2050) was approved by Cabinet on 14 July 2015.*

projection which equates to almost 39mtCO_2-e or 7.1tCO2-e per capita per year (Japan International Cooperation Agency, 2012). In March, BMA and JICA jointly evaluated a 3 year capacity building project funded by JICA and found that Bangkok achieved approximately 3.67mtCO2e reduction from 2007-2011 (JICA, 2012).

The 11th National Economic and Social Development Plan (2012-2016) aims to promote green economy development, along with an **Alternative Energy Development Plan 2012-2021 (AEDP) and a 20-year Energy Efficiency Plan 2010-2030**. These energy strategies aim for a 30% share for alternative energy of final energy consumption by 2036 and 30% energy intensity reduction from 2010 to 2036 (Thailand Office of Natural Resources and Environmental Policy and Planning, 2015b).

In addition, as part of the Environmentally Sustainable Transport System Plan, Thailand will impose a "carbon-based vehicle excise tax" (Thailand Office of Natural Resources and Environmental Policy and Planning, 2015b p51) and further develop rail infrastructure. Furthermore, a Thailand Climate Change **Strategic Plan in the Agricultural Sector for 2013-2016** has also been developed.

Climate Change Institutional Framework

The **National Climate Change Committee** consists of a Negotiation, Technical, and Integrated Policy and Plan sub-committees, and is chaired by the Prime Minister. Thailand also established an Office of Climate Change Co-ordination and with a royal decree, the Thailand Greenhouse Gas Management Organization as the designated national CDM body.

An Energy Policy and Planning Office was established within the Ministry of Energy. The Department of National Parks, Wildlife and Plant Conservation in the Ministry of Environment co-ordinates the country's REDD+ activities.

Climate Change Activities

Mitigation activities aim to promote energy security, energy savings and renewable, clean energy sources. They also aim to support emissions reduction by improvements in the forestry sector, and by measuring the carbon footprint of products and services. A carbon tax system imposing new tax rates on cars computed on the basis of the rate of carbon dioxide emissions, instead of the engine capacity was announced in 2015 and low-carbon growth of cities is being promoted.

Adaptation actions aim to collect climate information, develop financial mechanisms to support policy integration, and capacity building activities. In addition, multi-country projects are implemented for various sectors for capacity building, vulnerability assessment, research, and policy integration and formulation.

Figure 22: Number of climate projects and activities in Thailand, by theme

Source: Southeast Asia Network of Climate Change Offices, 2016

Mitigation project examples include feasibility studies for waste management, renewable energy development, energy efficiency improvements, solar power and biogas installations, energy efficiency measures implementation, capacity building, and awareness-raising projects on various themes. An Energy Performance Certificate (EPC) scheme has been introduced in energy-intensive sectors, and preparations are underway to ensure legal, technical and institutional readiness to implement the scheme. A Carbon Footprint and a Carbon Reduction Label Program has also been introduced under which products that reduce their emissions by more 2% as compared to their base year emissions can register themselves. As of October 2015, the program has registered 112 products.

The Thailand Greenhouse Gas Management Organization (TGO) is currently developing the Thailand Voluntary Emissions Trading Scheme (Thailand V-ETS) by collaborating with Partnership for Market Readiness (PMR) hosted by the World Bank – an initiative that provides knowledge and funding to support the establishment of ETSs (International Carbon Action Partnership, 2016). This voluntary domestic carbon crediting scheme has been implemented to issue credits for GHG reduction projects. As of 2016, the scheme has seen 20 registered projects have led to annual emissions reductions of more than 700,000 tons CO2e (Thailand Office of Natural Resources and Environmental Policy and Planning, 2015b). The TGO is also developing a Low Carbon City (LCC) Program as part of the World Bank's PMR to help Thai provinces, cities, and municipalities to build a GHG inventory along with an MRV system for citywide emissions and set reduction targets. The TGO will translate these mitigation actions into emissions reduction certificates ("Certificates") under the TVER.

Adaptation project examples include flood and water resource management projects, feasibility studies, and various climate vulnerability and impact studies. A Sustainable Tourism action plan has been developed.

Implementation challenges include improvement of GHG inventory for major sectors, development of sub-national, local GHG inventories, and development of specific know-how related to mitigation activities in different sectors. Especially for large scale deployment of renewable energy and energy efficiency projects, barriers that are common to most developing countries such as lack of finance and inadequate avenues for technology transfer are applicable to Thailand as well.

In terms of climate scenarios, there is a lack of capacity to downscale available information and a lack of research techniques, to prioritise key sectors and analyse best alternatives for adaptation. Moreover, the integration of adaptation options of risk-prone communities should be further studied.

Intended Nationally Determined Contribution

Thailand submitted its INDC on 1 October 2015, under which it has pledged to reduce its GHG emissions by 20% as compared to a BAU scenario with 2005 as the reference year. This is equivalent to approximately 555 MtCO2-eq by 2030. The ambitiousness of the pledge can be further increased to 25% "subject to adequate and enhanced access to technology development and transfer, financial resources and capacity building support through a balanced and ambitious global agreement under the UNFCCC" (Thailand Office of Natural Resources and Environmental Policy and Planning 2015, p1). Some of the key sectoral level targets are outlined in the table below:

Table 43: Thailand's INDC in sectoral breakdown

Sectors	Target	Base year	Target year
Energy	20% of power generation from renewable sources	n.a.	2036
	30% share of renewable energy in total final energy consumption	n.a.	
	30% reduction in energy intensity	2010	
Forestry	Increase national forest cover to 40%	n.a.	n.a.

Thailand's INDC further notes that it has already achieved a 4% emission reduction from 2020 BAU levels and is in line to successfully achieve the 7% target pledged as its voluntary domestic effort by 2020. On market mechanisms, Thailand's INDC states that it will continue to consider utilization of market or non-market approaches to enable higher amounts of technology transfer, further capacity building and improved access to finance. Furthermore, the INDC notes that means of implementation for adaptation will also be necessary.

Country References Used

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- UNSD (2014) UN Data
- World Bank (2016) World Development Indicators
- WRI (2016) CAIT Climate Data Explorer

[The full references are included in the bibliography.]

VIET NAM

Table 44: Viet Nam's national statistics

Country Parameters	2014
GDP per capita (current USD)	1,907
Population (thousands)	90,728.9
Population density (people per km2 of land area)	274.0
Share of urban population (% of total)	33
Percentage of people under poverty line	13.5

Source: Statistical Yearbook of Viet Nam 2014 (www.gso.gov.vn)

Viet Nam's economy has been steadily growing and rapidly industrialising in recent years, but 60% of the overall population still relies primarily on agriculture, particularly on rice production. Viet Nam is among the countries that are likely to be most affected by climate change. This vulnerability is heightened since the major part of the population and the main economic and production centres are located along the country's 3,260 km coastline which is heavily affected by the impacts of climate change.

Observed and Projected Climate Impacts

The coastline of the country is frequently affected by storms, and many of the provinces are exposed to water stress as a result of droughts. By 2050, 0.28-0.33m sea level rise is projected, which will also increase coastal flooding and salt-water intrusion.

Table 45: Changes in temperature and precipitation in Viet Nam

	Observed	Projected
Mean annual temperature	0.5°C increase since 1966	1.7-4.0°C by 2100
Mean annual rainfall	The variation and the intensity of rainfalls have increased	Winter and summer rainfall is expected to increase, and the frequency of heavy and extreme rainfalls and flooding will also rise
Sea level rise	0.2 m since 1966	28-106 cm by 2100

Source: World Bank, 2014 and Viet Nam Ministry of Natural Resources and Environment, 2015.

Adaptation Needs

Adaptation activities need to improve the resilience of the agriculture and the forestry sectors, to develop disaster-resistant energy services, and to protect and improve coastal areas and biodiversity (World Bank, 2014):

- **Agriculture:** Changes in cultivation practices and cropping patterns, more efficient land and water management, agricultural incentives and insurances, and research in agricultural technology will also be needed to reduce vulnerability in the long term.
- **Coastal ecosystems:** Aquaculture plans, heat-tolerant varieties in aqua farming, improved aqua farming management capacities, additional storm shelters for fishing ships, and improve hazard warning communication.
- **Energy and transportation:** Energy efficiency and conservation measures, assessment of future energy demand at provincial level, planning and design of climate-resilient energy, and transport infrastructure needs to be geared to handle potential changes in climate and hydrological variables.
- **Forests:** Improved sustainable forest management, research to identify resilient plant and tree species, improved timber use efficiency, afforestation and reforestation programs, and poverty reduction in upland forest areas.

GHG Emissions

Since 2000, Viet Nam almost tripled its CO2 emissions and doubled its total GHG emissions (without LUCF). Till 2011, the CO2 emissions per capita have reached 1.97 metric tons.

Table 46: Emissions summary for Viet Nam

Total GHG/CO_2 emissions	2010 (UNFCCC)	2011 (World Bank)	2012 (WRI)
CO_2 emissions without LUCF (kt)	146,036.78	173,210.74	173,050
CO_2 net emissions/removals by LUCF (kt)	-20,347.59		
CO_2 net emissions/removals with LUCF (kt)	125,689.19		
GHG emissions without LUCF (kt)	266,049.24		264,200
GHG net emissions/removals by LUCF (kt)	-19,218.59		
GHG net emissions/removals with LUCF (kt)	246,830.64		251,180
CO_2 emissions per capita emissions without LUCF (metric ton)		1.97	1.95

Source: Viet Nam Ministry of Natural Resources and Environment, 2014; World Bank, 2016 and WRI, 2016

Climate Change Strategic Planning

Viet Nam signed the UNFCCC on 11 June 1992 and ratified it on 16 November 1994. The Convention came into force on 14 February 1995. The Kyoto Protocol was signed by Viet Nam on 3 December 1998 and the country ratified it on 25 September 2002. The Protocol came into force on 16 February 2005.

To implement the UNFCCC and the Kyoto Protocol, Viet Nam set up a National Steering Committee; submitted its Initial National Communication (2003), Second National Communication (2010), and

Initial Biennial Update Report (2014) to the UNFCCC Secretariat. These efforts reflect the latest climate change response efforts and GHG inventories in Viet Nam.

In 2011, the **National Climate Change Strategy** was issued, outlining the objectives for 2011-2015 and 2016-2050, and priority projects to be implemented in the period of 2011-2015. A **National Strategy on Environment** and a **National Green Growth Strategy** was also developed and adopted in 2012. The objectives of the latter include the reduction of GHGs, greening lifestyles, promoting sustainable consumption, and adopting communication and awareness strategies. In 2014, the revised Law of Environment Protection was passed, including a chapter on climate change activities (GLOBE, 2015).

There are no binding targets, but the country adopted a voluntary 20% GHG emissions mitigation target to be achieved by 2020 (compared to 2005 levels). In its statement at the COP18, it also pledged to reduce the national GHG emissions intensity by 8 to 10% (compared to 2010); energy consumption per unit of GDP by 1-1.5% per year, and GHG emissions from energy activities by 10% to 20%.

As a response to the effects of climate change on agriculture and rural development, an Action Plan for 2011-2015 and a Vision until 2050 was issued by the Ministry of Agriculture and Rural Development in 2011.

Climate Change Institutional Framework

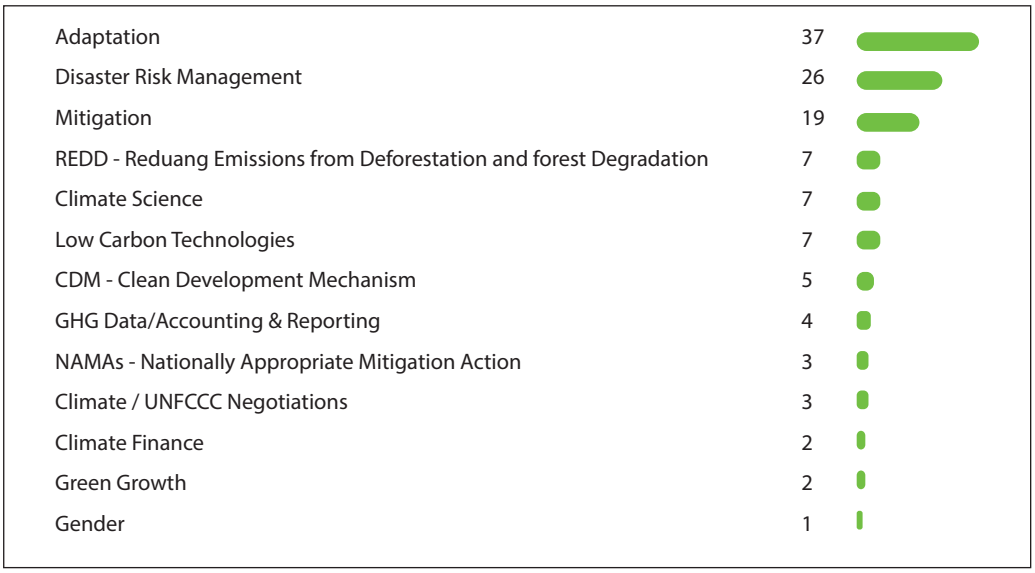
The Ministry of Natural Resources and Environment was appointed by the government as the National Focal Point to implement the UNFCCC and Kyoto Protocol. It also serves as the permanent agency of the National Committee for Climate Change; the main coordination body for implementation of the National Climate Change Strategy.

Institutional arrangements for NAMA and for MRV activities are under development.

Climate Change Activities

Viet Nam's climate activities focus on a wide variety of sectors including agriculture, forestry, aquaculture, energy, transportation, and public health. Greenhouse gas mitigation is also promoted by identifying energy efficiency and conservation, as well as emissions mitigation areas and implementation of renewable energy projects. Education, training and public awareness raising activities on mitigation and adaptation are also carried out.

Figure 23: Number of climate projects and activities in Viet Nam, by theme



Source: Southeast Asia Network of Climate Change Offices, 2016

There are numerous public and private funded climate initiatives in Viet Nam. The Ministry of Environment and Natural Resources introduced a National Target Program to Respond to Climate Change. The National Program on Energy Efficiency and Conservation aims to achieve energy targets set by the government.

As of June 2015, Viet Nam had 254 accredited and registered Clean Development Mechanism (CDM) projects that account for total reduction of approximately 137.4 million tCO2e in their crediting periods. 87.6% of these projects are related to energy while waste treatment projects account for 10.2%, reforestation and afforestation for 0.4% and other projects for 1.8%. To date, these CDM projects have secured more than 12 million Certified Emission Reductions (CERs).

Whilst Viet Nam has implemented a number of mitigation activities (Viet Nam accounts for the fourth highest number of registered CDM projects and ranks eleventh in terms of number of CERs issued), it faces a number of challenges in implementing mitigation actions. These include insufficient capacity to establish a national GHG inventory system and other MRV systems; lack of technologies to reduce emissions, especially from agriculture; and inability to tap international and domestic sources of finance.

With assistance from the World Bank's PMR program, Viet Nam is considering the introduction of a sector-based cap-and-trade program in the steel sector, which could start in 2020. The project, worth USD 3.6 million (USD 3 million funded by the World Bank and USD 600,000 from the Vietnamese Government), was approved by Prime Minister Nguyen Tan Dung in October 2015 following an application from the Ministry of Planning and Investment (Vietnam News, 2015). Under the project, over USD 1.2 million will be allocated to the Ministry of Natural Resources and Environment; USD 760,000 to the Ministry of Industry and Trade; USD 700,000 to the Ministry of Construction; USD 140,000 to the Ministry Of Planning And Investment; and USD 140,000 to the Ministry of Finance. The environment ministry has been assigned to co-operate with relevant agencies to run the 36-month project. Immediate actions identified by Viet Nam included the need to scale-up crediting work both in the domestic and international contexts. Viet Nam has also identified the need to mobilize resources for awareness raising and capacity building for leaders at the central level in order to enhance political will to implement the carbon market by 2020 (Socialist Republic of Viet Nam Ministry of Natural Resources and Environment, 2016).

Regarding adaptation, the INDC mentions the following implementation challenges: insufficient legal framework; limited institutional co-ordination; insufficient financing from domestic sources and limited international public and private sources; human and technological capacity constraints.

Intended Nationally Determined Contribution

Viet Nam submitted its INDC on 30 September 2015. As per the INDC, Viet Nam has pledged to unconditionally reduce domestic emissions by 8% by 2030 as compared to a Business As Usual scenario.

Table 47: Viet Nam's INDC in sectoral breakdown

Sectors	Target	Base year	Target year
Emissions	20% emissions intensity (of GDP)	2010	2030
Forestry	Increase national forest cover to 45%	n.a.	2030

Source: Socialist Republic of Viet Nam Ministry of Natural Resources and Environment (2015)

There is a conditional contribution of increasing the emissions intensity reduction to 25% should Viet Nam receive international support through bilateral and multilateral cooperation, and to 30% should the new mechanisms under the Paris Agreement be implemented (Socialist Republic of Viet Nam Ministry of Natural Resources and Environment, 2015).

The coverage of the INDC is the entire economy, including the energy, agriculture, land use, land use change and forestry (LULUCF) and waste sectors. Gases include carbon dioxide, methane, nitrous oxide, hydroflourocarbons, perflourocarbons, and sulfure hexafluoride.

The adaptation component in the INDC describes the climate change adaptation actions that are currently being implemented. Furthermore, it identifies adaptation gaps in sectors such as development of institutions and policy frameworks, human resource capability, and financing and technology. It also provides a list of adaptation measures to be implemented between 2021 and 2030. Viet Nam estimates that it will be able to cover only one-third of the costs of implementing these measures, whereas the rest will have to be financed through international and private sector investment.

The INDC also details the underlying policy framework and the planned actions to achieve the reduction targets. For mitigation, this latter includes the improvement of institutional capacities; the enhancement of energy technologies; the diversification of energy sources and renewables deployment, the promotion of sustainable agriculture and forest management practices; improved waste management; communication and awareness raising as well as improvement of international cooperation in the field of research, investments and external support. For adaptation, it notes the need for improved early warning systems and disaster management capacities; improved social resilience and better management of sea-level increase and flooding events.

Country References Used

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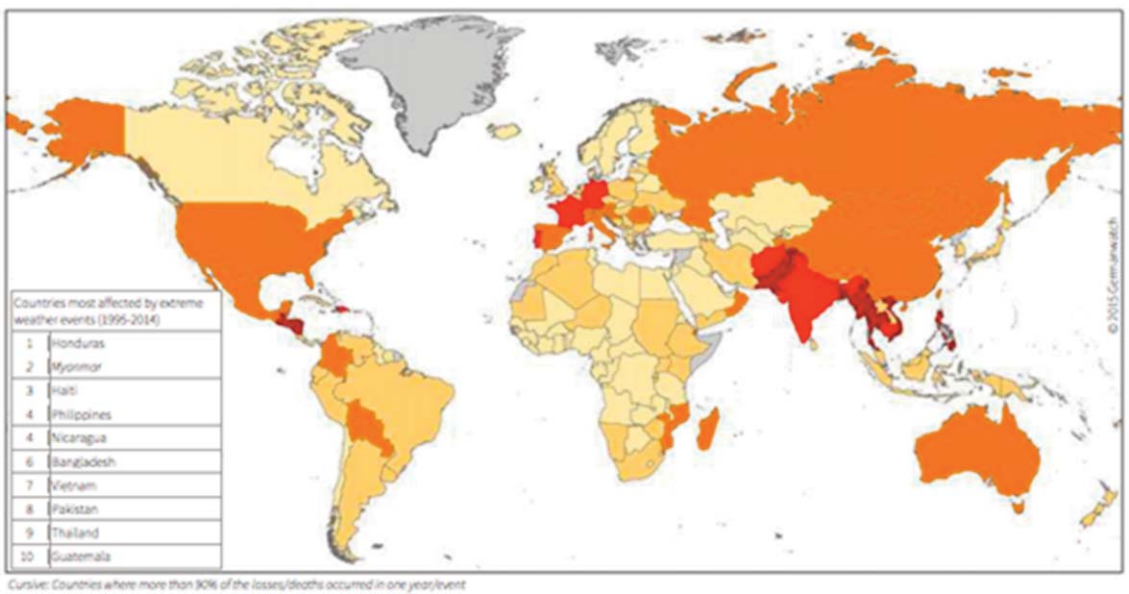
[The full references are included in the bibliography.]

With future prospects of worsening climate change, the ASEAN community must seek common interest areas at the climate negotiations, and promote these interests for the 2015 Climate Agreement. In order to help facilitate these points of convergence, this chapter provides an overview of climate vulnerabilities, adaptation needs, emission characteristics, mitigation commitments, and climate strategies and actions of the ASEAN Community.

Climate Vulnerabilities

The ASEAN region is highly vulnerable to climate change and is already heavily affected by it. The recently released Germanwatch Global Climate Risk Index lists 4 of the AMS (Myanmar, Philippines, Thailand and Viet Nam) among the ten most affected countries by extreme weather events between 1995 and 2014.

Figure 24: Global Climate Risk Index: Overall ranking between 1995-2014



Source: Germanwatch

The Germanwatch study calculated the Global Climate Risk Index by quantifying the human and economic losses due to extreme weather events during the 1995-2014 period. Table 25 provides an overview of these figures in the AMS. For the ASEAN community as a whole, the death toll of extreme weather events was 8,950 persons – i.e. 17.38 deaths per 100,000 inhabitants during the 1995-2014 period. Additionally, the total GDP loss due to extreme events in the ASEAN was USD 15,848 million (at PPP) over the 1995-2014 period.

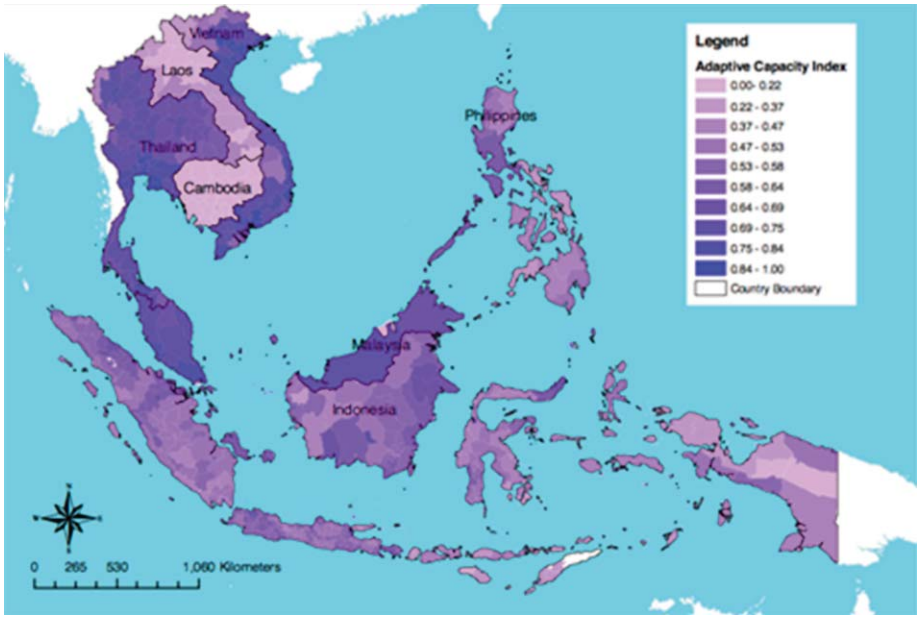
Table 48: Germanwatch Global Climate Risk components in ASEAN for the 1995-2014 period

Overall CRI Rank	Country	Death Toll	Deaths per 100 000 inhabitants	Losses in million USD PPP	Losses per GDP in %
2	Myanmar	7137.2	14.7464	1140.29	0.744
4	Philippines	927	1.1003	2757.3	0.675
7	Viet Nam	361.3	0.4418	2205.98	0.703
9	Thailand	164.2	0.2544	7480.77	1.046
13	Cambodia	57.45	0.4363	235.28	0.945
66	Indonesia	257.1	0.1163	1679.47	0.095
81	Lao DPR	5.6	0.0961	74.961	0.375
87	Malaysia	39.75	0.154	270.359	0.058
177	Brunei Darussalam	0.1	0.0283	0.387	0.001
179	Singapore	0.1	0	3.006	0.001

Source: Germanwatch, 2014

The degree to which a certain country will be affected by climate change also depends on its adaptive capacity. This encompasses the socio-economic and technological factors that can offset damages caused by extreme weather events.[51] According an assessment by Yusuf and Francisco (2009), Malaysia, Thailand and Viet Nam have relatively higher adaptive capacities, compared to Cambodia and Lao PDR which have relatively lower adaptive capacities among the ASEAN states. This suggests that the latter countries are less resilient to the adverse effects of climate change.

Figure 25: Adaptive capacity of the Southeast Asian region (2005)



Source: Yusuf and Francisco, 2009

[51] *Factors include the level of human development (measured by HDI), poverty, economic inequalities, as well as the existence of road and telecommunication infrastructure, energy and irrigation systems.*

There are several other varying studies and assessments evaluating the extent of a nation's adaptive capacity to climate change. For example, a recent study conducted by the Stockholm Environment Institute (SEI) (2016) assesses "adaptation readiness" through components such as political leadership, scientific research, available funding for planning and public support. The assessment categorized ASEAN nations into three main groups being: (1) the adaptation pioneers; (2) the emerging champions; and (3) the wait-and-see-adaptors.

According to researchers at SEI, "adaptation pioneers" are countries that regard adaptation with great urgency and have already established institutional frameworks to address it. This group is comprised of the Philippines and Viet Nam, where there have been disaster occurrences that have triggered and stimulated policy engagement. The second group, the "emerging champions", include Cambodia, Indonesia and Myanmar that use novel adaptation tactics to increase their adaptation readiness. Finally, the "wait-and-see adaptors" are mainly upper middle-income nations – most notably Malaysia and Thailand – that are relatively less exposed and vulnerable to climatic disasters and therefore less focused on adaptation compared to their neighbours.

Adaptation Needs and Actions

While some of the expected climate impacts are country-specific, other sectors and areas will be affected throughout most of the ASEAN region. Table 47 gives an overview of the most vulnerable sectors in each of the AMS.

Table 49: Key vulnerable sectors to climate change in the ASEAN

	Agriculture Food Security	Coastal Zones	Marine ecosystems	Terrestrial Ecosystems	Forestry	Disasters	Energy	Public Health	Waste Sector	Water Resources	Infrastructure
Brunei Darussalam	☐	☐	☐	☐	☐					☐	
Cambodia	☐	☐			☐			☐			☐
Indonesia	☐	☐			☐			☐		☐	
Lao PDR	☐				☐			☐		☐	☐
Malaysia	☐	☐	☐		☐	☐	☐	☐	☐	☐	
Myanmar	☐	☐	☐	☐	☐	☐		☐		☐	☐
Philippines	☐	☐	☐	☐				☐			
Singapore		☐	☐					☐		☐	☐
Thailand	☐	☐	☐		☐		☐	☐		☐	☐
Viet Nam	☐	☐	☐	☐	☐		☐	☐		☐	☐

Source: ALM Country Profiles, World Bank Climate Change Knowledge Portal, 2014; INDC's for each AMS (UNFCCC).

Due to similar regional characteristics, there are some adaptation areas that are prioritised in the majority of the AMS. These include coastal zones, coastal and marine ecosystems, public health, agriculture and food security, as well as forestry. Identified adaptation solutions throughout the AMS include (but are not limited to) the following:

- **Agriculture:** Climate-resilient crop varieties, diversified production, improved management of soil and water resources, drainage systems, irrigation facilities, and flood and drought monitoring systems.
- **Forestry:** Research and provision of climate information and forest degradation, community reforestation programmes, improved sustainable forest management, and poverty reduction in forest areas.
- **Coastal areas:** Integrated coastal resources management, and improved observation and research on coastal environmental change.
- **Disaster risk reduction:** Improved weather observation capacities, flood and drought early warning systems, and assessment of the hydrological impact of climate change on river systems.
- **Public Health:** Health education programmes, health extension services and malaria surveillance systems, infrastructure and disease control programmes, community involvement in defense strategies, climate-resilient health facilities, safe water supplies, and sanitary latrines.
- **Water resource management:** Quality and quantity assessment studies, improved forecasting, water and watershed management practices, and flood prevention infrastructures.
- **Infrastructure:** Finance for the maintenance of infrastructure, build resilient infrastructure based on potential climate change impacts, resettle communities under immediate threat, improve standards for infrastructure and continuously inspect existing infrastructure.

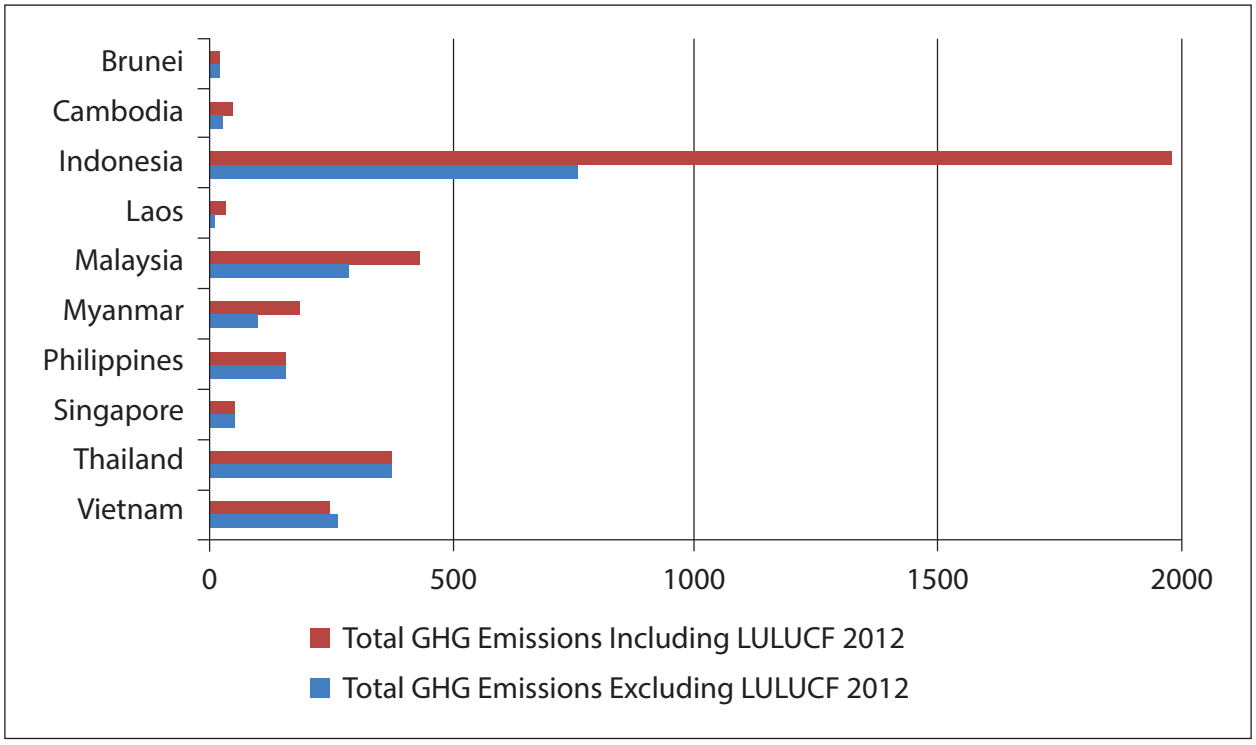
GHG Emissions

For most of the AMS, the latest UNFCCC GHG emissions data is available for the year 2010.

More up-to-date GHG emissions data is available via the World Resource Institute's Climate Analysis Indicators tool (CAIT), however the data collection and calculation is not identical to the one used by the UNFCCC, creating some difficulties in making comparisons.

Nevertheless the data collected by CAIT gives a good approximate indication of the latest emissions trends. According to this dataset, in 2012, the GHG emissions in the ASEAN region reached 2.05 billion tCO2, excluding LUCF, and 3.55 billion tCO2 including LUCF.

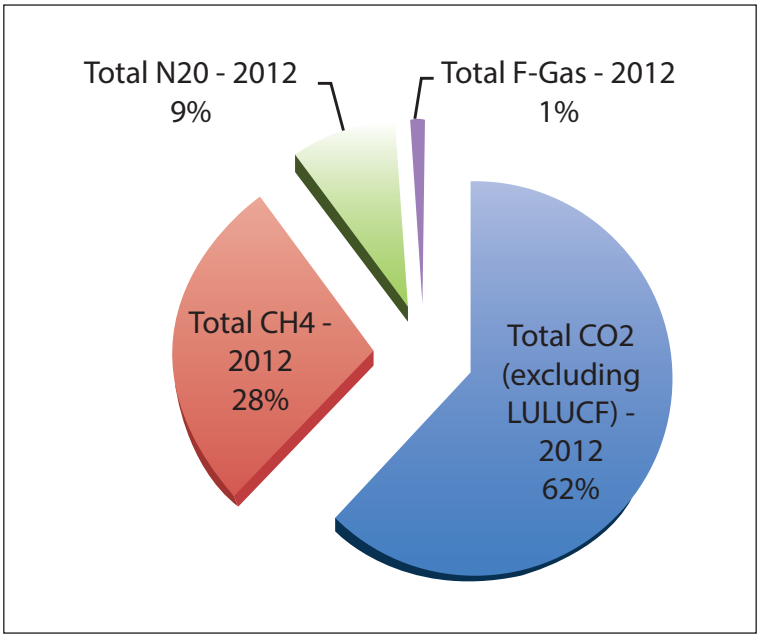
Figure 26: Total GHG emissions of ASEAN Member States - 2012 ($MtCO_2$)



Source: WRI, 2016

The CAIT calculations also indicate that the relative share of GHG emissions in the ASEAN region differ considerably from the world average, with a higher share of methane and nitrous oxide gases, originating from the forestry and agriculture sectors. Although the majority of GHG emissions (62%) originate from CO_2 emissions in the ASEAN region, methane and nitrous oxide gases also had a significant share of 28% and 9%, respectively. However, as compared to 2011, the share of CO_2 emissions has risen from 58% to 62%, while the share of nitrous oxide has fallen from 14% to 9%.

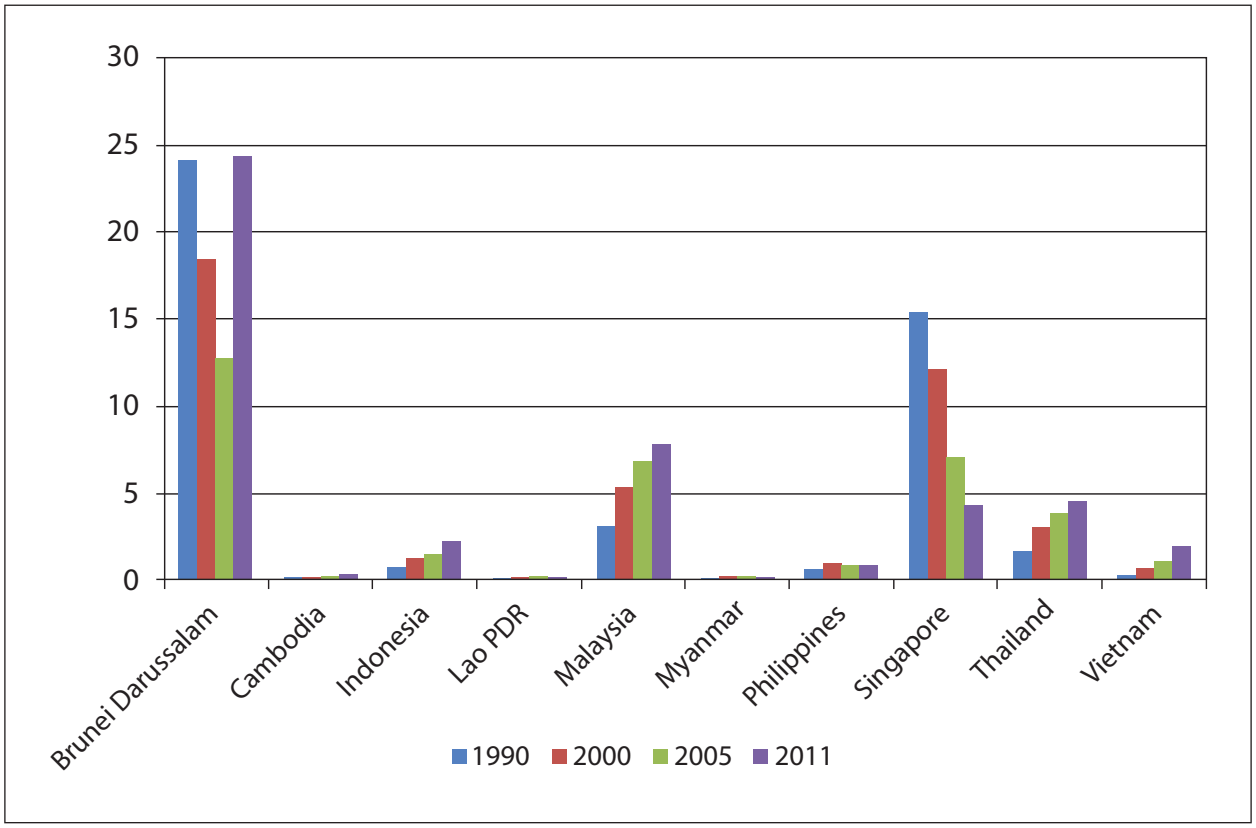
Figure 27: GHG emissions by Gas – 2012 (MtCO2) in the ASEAN region



Source: CAIT, 2016

CO_2 emissions per capita data was collected from the World Bank's World Development Indicators database. According to these calculations, the per capita CO_2 emissions in the region have been increasing since 1990 (except for Singapore), however these are still well below the world average (4.94 metric tonnes in 2011), except in Brunei Darussalam and Malaysia.

Figure 28: Carbon dioxide emissions per capita in ASEAN Member States - metric tons of CO_2 per capita



Source: World Bank, 2016

Commitments to Mitigate GHG Emissions

To slow down the increase of GHG emissions, many of the AMS have pledged to contribute to international GHG mitigation efforts. Table 48 outlines these commitments, including overall GHG emission reduction pledges, energy consumption improvements, and reforestation and afforestation targets.

Table 50: Overview of ASEAN Member States climate targets

Country	Sector	NAMA Target for 2020	INDC Target for 2030
Brunei Darussalam	Energy	n.a	• Reduce energy consumption ➔ 63% by 2035 BAU • Reduce energy intensity ➔ 45% by 2035 • Increase the share of renewables ➔ 10%
	Land Transport		CO2 from morning peak hour vehicle use ➔ 40% below BAU by 2035
	Forestry		Gazette forest reserves ➔ 55% of total land are
Cambodia	Energy	n.a	Reduce emissions ➔ 16%
	Manufacturing		Reduce emissions ➔ 7%
	Transport		Reduce emissions ➔ 3%
	Other (e.g. waste and buildings)		Reduce emissions ➔ 1%
	Forest Cover		Increase by 60% total land area by 2030
Indonesia	Overall Emissions Reduction	Reduction of GHG Emissions ➔ 26% (Unconditional) ➔ 15% (Conditional)	Reduction in emissions ➔ 29% BAU by 2030 (Unconditional) ➔ 41% BAU by 2030 (Conditional)
	Energy	n.a	Renewable Energy ➔ 23% of energy use by 2025
	Forestry	n.a	Moratorium on the clearing of primary forest and prohibiting conversion of peat lands by 2016
	Waste		Strengthen institutional capacities for urban waste by 2020
Lao PDR	Forestry	70% for total land area by 2020	70% for total land area by 2020
	Energy	n.a	• Increase renewable energy ➔ 30% of total energy consumption • Increase large hydro capacity to 5.5 GW by 2020 and 20 GW by 2030 • Rural electrification ➔ 90% of households
	Transport		Increase biofuels ➔ 10% of fuel demand
Malaysia	Overall Emissions Reduction	Reduction emission intensity ➔ 40% by 2020 (2005 base level)	Reduction in GHG emissions intensity ➔ 45% by 2030 relative to emissions 2005 (Conditional) ➔ 35% (Unconditional)

Country	Sector	NAMA Target for 2020	INDC Target for 2030
	Energy	Increase renewable energy ➔ 11% by 2020	n.a
Myanmar	Energy	n.a	• Increase share of hydro ➔ 9.4 W by 2030 • Increase rural electrification ➔ 30% renewable energy • Electricity saving potential ➔ 20%
	Forestry		• Reserved Forest (RF) & Protected Forest (PF) ➔ 30% of total land area • Protected Area Systems (PAS) ➔ 10% of total land area
Philippines	Overall Emissions Reduction	Reduction in emissions ➔ 5% by 2012 (1990 levels) ➔ 10% by 2028 (later withdrawn)	GHG emissions reduction ➔ 70% by 2030 to BAU scenario
Singapore	Overall Emissions Reduction	Reduce GHG emissions ➔ 7-11% BAU by 2020 (Unconditional) ➔ 16% BAU by 2020 (Conditional)	Reduce emission intensity ➔ 36% from 2005 levels by 2030
	Energy	• Increase energy efficiency ➔ 35% by 2030 (from 2005) • Contingent on a legally binding global agreement in which all countries implement their commitments in good faith.	Stabilize emissions ➔ aim to peak around 2030
Thailand	Energy	Increase alternative energy share ➔ 25% by 2021	• 20% of power generation from renewable sources • 30% share of renewable energy in total final energy consumption • 30% reduction in energy intensity by 2036
	Forestry	n.a	Increase national forest cover to 40%
	Overall Emissions Reduction	Reduction GHG emissions ➔ 20% by 2020	Reduce GHG emissions ➔ 8% BAU by 2030 (Conditional) ➔ 25% BAU by 2030 (Unconditional)
Viet Nam	Energy	• Energy: 8% | Agriculture: 20% | Water: 5% | LULUCF: 20% • Reduce GHG emissions intensity ➔ 8-10% (compared to 2010) • Reduce energy consumption per unit of GDP ➔ 1-1.5% per year	Reduce emission intensity ➔ 20% below 2010 levels (Conditional) ➔ 30% (Unconditional)
	Forestry	n.a	Increase to 45% of total land area

As explained in Chapter 2 Global Climate Negotiations, efforts to promote sustainable development, improve capacity building, technology and finance, and stabilize and reduce greenhouse gas emissions for developing nations were established under the label of Nationally Appropriate Mitigation Actions (NAMAs). The NAMAs were originally signed through the Bali Action Plan and were recognized as voluntary pledges (Table 48). Currently there are 165 NAMAs being implemented. They are a flexible tool to encourage low carbon developments. However, it is remains unclear as to how NAMAs will be linked with the current INDC and climate agreements beyond 2020. The recently submitted mitigation ambitions, INDCs, are target strategies for a post-2020 climate regime. Nonetheless, a third of developing countries include NAMA's role within their INDCs, especially low-income countries.

NAMAs and INDCs vary in their intent. For instance, INDCs are a country's goal at a national level, while NAMAs are national or individual voluntary action within single sectors. Additionally, it is mandatory under the Paris Agreement for Parties to pursue domestic mitigation measures and to take responsibility for accounting for their respective INDCs. Additionally, the agreement mandates Parties to regularly report progress on their pledges. However, NAMAs do not mandate but instead offer an open invitation for countries to communicate NAMAs. Despite their differences, the NAMAs could possibly give an early indication whether the 2030 targets of the INDCs are on track or whether additional resources must be mobilized to support the mitigation strategies.

NAMAs could also be seen as a stepping-stone to achieve the INDCs. It is possible for NAMAs to play a role as an implementation tool by meeting the targets of INDC through specific mitigation targets. Therefore in the end both the NAMAs and INDCs can together mutually reinforce each other.

Mitigation commitments are also enhanced by regional co-operation among the AMS in the field of energy, agriculture and forestry as well as carbon trading:

- **Energy measures:** The ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2020 recognizes energy as the key to achieving the ASEAN Economic Community (AEC). The plan aims to enhance energy connectivity and market integration to ensure energy security coupled with accessibility, affordability and sustainability. The main initiatives under APAEC include establishing multilateral electricity trading across ASEAN to accomplish the ASEAN Power Grid (APG) and expanding the Trans-ASEAN Gas Pipeline (TAGP) to also include liquefied natural gas (LNG). The plan further emphasizes energy efficiency by intensifying renewable energy use and exploring nuclear energy capabilities. These objectives will be achieved through a two-phase strategy.

- **Agriculture and forestry:** Agriculture plays a critical role in the ASEAN region, yet the sector remains highly vulnerable to climate change. At the same time, this sector is also responsible for a significant share of the region's total GHG emissions. Thus the ASEAN member states have embarked on measures to enhance regional integration to ensure food security (Ewing, 2016). ASEAN adopted the Multi-Sectoral Framework on Climate Change: Agriculture, Fisheries and Forestry Towards Food Security in 2009 (Letchumanan, 2009). Additionally, ASEAN formulated the Vision and strategic plan of ASEAN Cooperation in food, agriculture and forestry towards (2016-2025) in 2013. This plan incorporates the pressures induced by climate change on nations and food security by increasing resilience, mitigation and adaptation of climate change by prioritizing capacity building to reduce losses due to disasters and emergencies by tapping into national, regional and international cooperation (ASEAN, 2015).

- **Carbon Trading:** The ASEAN region has benefited from the CDM mechanism since 2001 and has also undertaken regional cooperation efforts to increase the number of projects and their positive outcomes in the AMS. Since 2012, economy-wide carbon market initiatives have also gained importance in the region, especially after the Republic of Korea adopted a law for the launch of national carbon trading from 2015 onwards (Townshend, 2014). To date, a few regional and national initiatives have been launched. At the regional level, bi-lateral carbon trading between Japan and some AMS via the Joint Crediting

Mechanism is already operational. At the national level, both Indonesia and Thailand are in the process of introducing voluntary emission trading schemes (Hsieh, 2014).

Climate Change Policies and Programmes

The AMS ratified both the UNFCCC and the Kyoto Protocol, and participate at the COPs. Furthermore, the challenge of climate change is also outlined and addressed in their national development plans. Except Brunei Darussalam and Myanmar, to date all AMS have adopted a national climate change strategy and assigned a committee or council to co-ordinate the implementation of the strategy. Many of them have also developed adaptation plans or programmes.

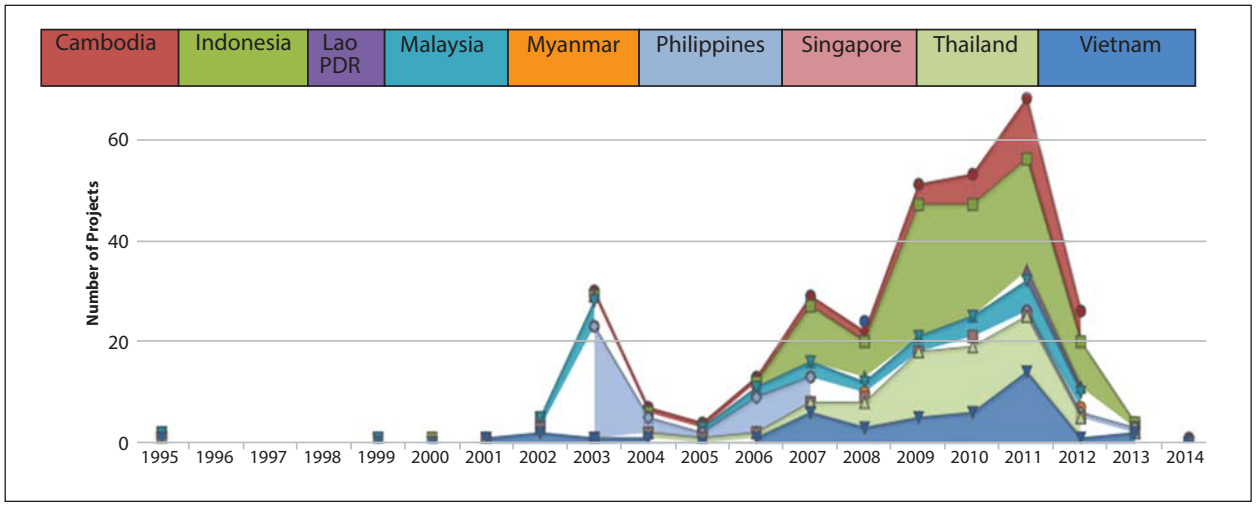
Table 51: Climate Change strategic and institutional frameworks in among ASEAN Member States

	UNFCCC and Kyoto Protocol	Climate change mentioned in the development plan	Climate Change Strategy	Climate Change Committee or Council	Adaptation Action Plan or Programme
Brunei Darussalam	☐	☐	☐	☐	
Cambodia	☐	☐	☐	☐	☐
Indonesia	☐	☐	☐	☐	☐
Lao PDR	☐	☐	☐	☐	☐
Malaysia	☐	☐	☐	☐	
Myanmar	☐	☐			☐
Philippines	☐	☐	☐	☐	☐
Singapore	☐	☐	☐	☐	
Thailand	☐	☐	☐	☐	
Viet Nam	☐	☐	☐	☐	☐

Source: Adapted from Yuen et al. (2009), UNFCCC (2015)

The implementation of climate change mitigation and adaptation activities has also accelerated in recent years. For example, the number of implemented climate projects has considerably increased. Prominent activities include climate research, CDM and REDD+ projects, disaster risk management projects, development of GHG emissions inventories, and low carbon technology deployment.

Figure 29: Growth trends of climate projects in ASEAN Member States



Source: ASEAN Climate Change Action Database (ACCAD)

All these trends point towards a positive momentum in AMS in addressing the current and future challenges of climate change. However, in order to maintain such momentum, there is a need for countries and communities to ensure specific regional and national challenges are dealt with in a timely manner.

Given the current unprecedented rate of the world's climate changing, it is now most urgent and crucial to support vulnerable communities, especially those in Southeast Asia that are increasingly being exposed to extreme weather events. Increasing investment in adaptive capacity, will aid in safeguarding economic progress, strengthening the climate resilience and significantly reducing disaster risks. Currently, the established adaptation policies in AMS are still new. Nonetheless, the efforts are increasing. For instance, all the AMS have encompassed adaptation strategies within their INDCs, such as Indonesia's goal to strength institutional capacity and implement an adaptation strategy aimed at reducing risks on all development sectors, and Lao PDR's INDC which includes the National Adaptation Programme of Action (2009) and the National Strategy on Climate Change (2010). However, in order to achieve coherent national adaptation strategies, member states must continue to strengthen funding for adaptation planning, establish monitoring and evaluating systems to assess adaptation efforts, enable sharing of adaptation expertise, insights and experiences and work towards building public support for adaptation.

As presented in this Handbook, many of the AMS already face or will face a variety of challenges, which can be linked to climate change. Their high vulnerability to climate change may severely affect their socio-economic development and potentially also their political stability. In addition, such negative developments may not remain solely a national-level problem, but spill over to other countries in the region as well. At the same time, it has been recognised that many of the most vulnerable sectors (such as agriculture, forestry, healthcare or water management) require a prioritisation of adaptation needs, which are relatively similar across AMS countries. These challenges can provide the AMS with a variety of opportunities for co-operation and identification of common solutions.

Such co-operation opportunities can also be identified for the mitigation of GHG emissions in the region. With many rapidly growing economies, the region is making an increasing large contribution to global emissions, and this accelerates the need for ensuring greener, low-carbon development. Important co-operation areas in this regard include the energy and forest sectors, and the establishment of carbon trading mechanisms.

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