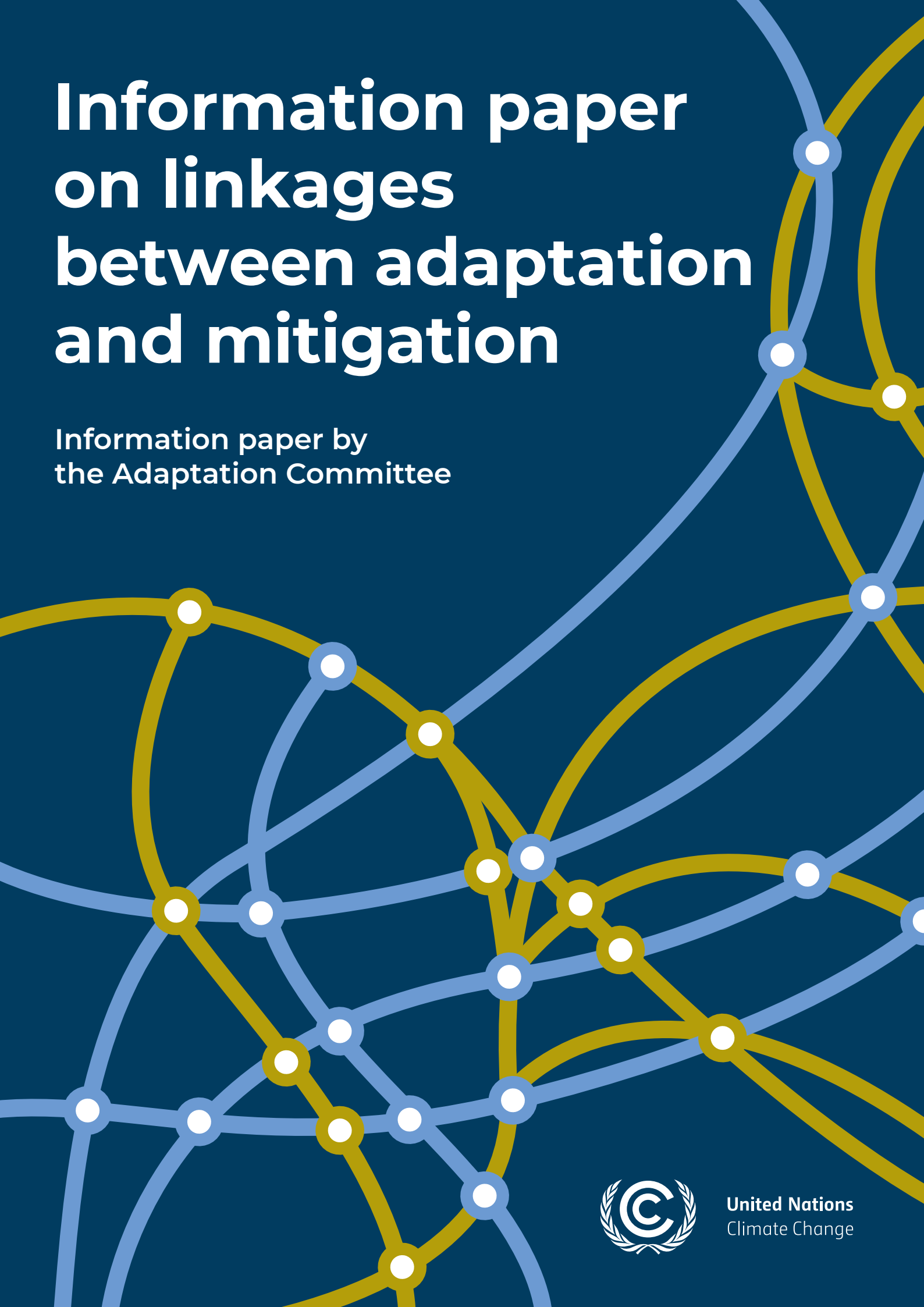
Information paper on linkages between adaptation and mitigation

Information paper by
the Adaptation Committee



United Nations
Climate Change

Information paper on linkages between adaptation and mitigation

Information paper by the Adaptation Committee

For further information contact:

Main office
UNFCCC secretariat
UN Campus
Platz der Vereinten Nationen 1
53113 Bonn
Germany

Telephone +49. 228. 815-10 00
Telefax +49. 228. 815-19 99

Email secretariat@unfccc.int
Website: https://unfccc.int

CONTENTS

1 INTRODUCTION AND BACKGROUND

1.1 Mandate

As part of its 2019-2021 flexible workplan, in particular its workstream on "Providing technical support and guidance to Parties on adaptation action" and the objective of "Enhancing the provision of technical support to developing country Parties for adaptation action in a coherent manner", the Adaptation Committee (AC) agreed to prepare an information paper on linkages between adaptation and mitigation.

1.2 Overall framing

Climate change is a threat to equitable and sustainable development. Adaptation, mitigation and sustainable development are inextricably connected, with potential for synergies and trade-offs.

The Paris Agreement emphasizes the intrinsic relationship that climate change actions, responses and impacts have with equitable access to sustainable development and eradication of poverty. Mitigation action to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above preindustrial levels will limit climate change risks and impacts. Adaptation action to enhance adaptive capacity, strengthen resilience, and reduce vulnerability to climate change will also contribute to climate-resilient pathways for sustainable development.

This issue has also received considerable attention in scientific literature, including recent IPCC reports, which described linkages between adaptation and mitigation in the context of sustainable development.

This paper elaborates on the adaptation and mitigation linkages, and on their inter-relationship with sustainable development.

1.3 Purpose and Structure

The purpose of this paper is to increase understanding of how linkages[1] have been addressed within different sectors and under the UNFCCC, including associated synergies and trade-offs.

Following an introduction, this paper includes the following sections:

Section two provides an overview of linkages between adaptation and mitigation as well as sustainable development in scientific literature, drawing mainly on four reports from the Intergovernmental Panel on Climate Change (IPCC):

a. The IPCC's fourth assessment report, in particular the chapter on inter-relationships between adaptation and mitigation;[2]

1 The terms inter-relationship, relationship and linkage have been used interchangeably across the document.

2 https://archive.ipcc.ch/publications_and_data/ar4/wg2/en/ch18.html.

b. The IPCC's fifth assessment report, in particular the chapter on climate-resilient pathways: adaptation, mitigation, and sustainable development;[3]

c. The IPCC's special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty;[4] and

d. The IPCC's special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas (GHG) fluxes in terrestrial ecosystems, in particular the chapter on interlinkages between desertification, land degradation, food security and GHG fluxes: synergies, trade-offs and integrated response options.[5]

In addition to the IPCC reports, scientific literature was consulted, where appropriate, including to extract examples for improved understanding of the linkages.

Section three elaborates on linkages under the UNFCCC, the Kyoto Protocol, and the Paris Agreement, including relevant decisions. This section also considers linkages with other international agendas, namely the 2030 Agenda for Sustainable Development, the Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), and the work of the Food and Agriculture Organization of the United Nations (FAO).

Section four captures information on linkages contained in reports submitted by Parties to the UNFCCC, namely documents related to National Adaptation Plans (NAPs), Nationally Determined Contributions (NDCs), and National Communications, and on linkages contained in projects funded by the GCF and GEF.

Section five addresses needs, challenges, and opportunities associated with the integration of adaptation and mitigation actions and sustainable development. Finally, section six, informed by previous chapters, presents a summary of key findings.

3 https://archive.ipcc.ch/report/ar5/wg2/.

4 https://www.ipcc.ch/sr15/ and https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers/.

5 https://www.ipcc.ch/report/srccl/.

2 A REVIEW OF SCIENTIFIC LITERATURE

There is increasing recognition in the scientific literature that choosing and implementing adaptation and mitigation options in a manner that increases synergies and avoids trade-offs is feasible in several sectors. It is also recognized that both synergies and trade-offs exist between adaptation and mitigation options, and that some sectors have greater potential for synergies than others, including energy-related sectors (e.g. properly designed biomass production and energy use in buildings) and land-related sectors (e.g. land management and forestry).[6]

Consistent with the IPCC, the paper discusses three types of linkages: (a) adaptation actions that have consequences for mitigation, (b) mitigation actions that have consequences for adaptation, and (c) inter-relationships between adaptation and mitigation options and sustainable development, including those under 1.5°C pathways.

2.1 Adaptation actions that have consequences for mitigation

Adaptation actions that have consequences for mitigation have been addressed under different sectors such as ecosystems, agriculture, energy and infrastructure, and at different scales, including at individual and community levels.

Adaptation actions such as **ecosystem-based adaptation projects** can have positive effects on mitigation through either increasing or maintaining carbon stocks. For example, mangroves contribute to stabilization of the coastline and prevention of erosion from waves and storms as well as to storing carbon. A recent study estimated that nature-based solutions could provide 37 per cent of cost effective CO_2 mitigation needed between now and 2030 to limit temperature increase to 2 degrees.[7]

However, trade-offs may arise when an ecosystem is prioritized over and at the expense of the other, such as the implementation of some adaptation projects upstream that may have effects on downstream communities. It is therefore critical to design and implement ecosystem-based approaches in a robust manner to avoid trade-offs.[8]

Studies have shown large potential for synergies between adaptation and mitigation within **the agriculture sector.** Some adaptation options that can benefit mitigation, particularly by increasing efficiency in nitrogen use and enhancing soil carbon storage, if properly managed, include (1) measures for crop rotation and diversity, (2) measures for soil moisture conservation, (3) measures that reduce nitrogen and phosphorus leaching, and (4) soil erosion prevention methods.[9] Moreover, improvement

6 https://archive.ipcc.ch/publications and data/ar4/wg2/en/ch18.html.

7 https://www.pnas.org/content/114/44/11645.

8 https://www.cbd.int/doc/c/9f64/178b/0f6394c5bf422cb156972f95/sbstta-22-08-en.pdf.

9 https://www.cambridge.org/core/journals/journal-of-agricultural-science/article/synergies-between-the-mitigation-of-and-adaptation-to-climate-change-in-agriculture/20FFDF69A92646BBE7390A2B54B10B58.

Chuttersnap/Unsplash

in irrigation techniques could lead to a reduction in water and energy demand. However, agricultural irrigation can reduce water levels in rivers and lakes, which could lead to negative impacts on biodiversity, especially wetlands.[10] Other adaptation projects in the agriculture sector that reduce deforestation have positive effects for mitigation.

Total net GHG emissions from agriculture, forestry, and other land use (AFOLU) were 12.0 +/- 3.0 $GtCO_2eq\ yr^{-1}$ during 2007-2016, representing 23% of total net anthropogenic emissions.[11] The livestock sector, including feed crop farming, can reduce emissions considerably by improved feed and stock management. According to the FAO, the livestock sector, which is currently contributing to approximately a third of GHG emissions from the AFOLU sectors, is estimated to have the potential of emissions reduction of up to 30 percent within the sector.[12]

Climate resilient **urban planning and development** have great potential in reducing emissions,[13] with cities contributing to approximately 70 per cent of total global energy-related carbon emissions. Adaptation

10 https://link.springer.com/article/10.1007/s10584-014-1214-0.

11 https://www.ipcc.ch/site/assets/uploads/2019/08/Edited-SPM_Approved_Microsite_FINAL.pdf.

12 http://www.fao.org/3/a-i7175e.pdf.

13 https://www.iea.org/reports/energy-technology-perspectives-2016.

practices such as green roofs, which help alleviate the negative effects of climate change by, for example, reduction in the urban heat island effect, can benefit mitigation by reducing energy demand, passive cooling and increasing capture of CO_2.[14] Among potential trade-offs is the increased emissions associated with infrastructure development. However, there is a new trend in low-carbon infrastructure development mainly resulting from lower costs due to technology improvements and competitive procurement.[15]

At the **individual and community level,** responsible consumption can reduce GHG emissions. For example, efficient use and conservation of water in urban areas that reduce energy used in heating water have positive effects on emissions reduction. On the other hand, an example of a negative consequence for mitigation is the use of air-conditioning in response to heatwaves, which increases electricity demand.

2.2 Mitigation actions that have consequences for adaptation

More efficient energy use and renewable sources, better management of land use and forests, emission reductions in agricultural practices, and mitigation through urban planning can have positive effects for adaptation by promoting local economies and livelihoods and enhancing adaptive capacity.

Positive effects of mitigation actions and policies on adaptation in **the energy sector,** particularly with regard to energy efficiency and renewable energy, include economic benefits, improved energy security and reduction in local pollutant emissions with subsequent health benefits. Hydropower reservoirs were also considered major sources of low-carbon electricity and a key area of mitigation in the energy sector. They have benefits for adaptation as they can be sources of water irrigation for agriculture, and enhance the economic development, especially in areas highly dependent on agriculture such as Senegal, Mali and Mauritania, which suffer deficits in staple cereal crops. However, hydropower reservoirs can have negative effects on biodiversity by changing the physical characteristics of the river such as water temperatures, water chemistry, and river flow characteristics.[16] Additionally, the impact of carbon taxes and energy prices can lead to reduction in resource use; for example, higher costs of fuels can reduce the use of mobile machinery (tractors and other farming vehicles) in semi-subsistence farming. However, the IPCC's fourth assessment report underscored the importance of energy in producing goods and providing services in many sectors of the economy; hence, there are negative effects associated with reducing the availability or increasing the price of energy on economic development and the economic components of adaptive capacity. There is a degree of uncertainty with regard to the magnitude of this effect.

14 https://www.sciencedirect.com/science/article/pii/S2210670713000048.

15 https://www.oecd-ilibrary.org/docserver/9789264308114-en.pdf?expires=1563966350&id=id&accname=ocid57015269&checksum=8A27A9BA8CAF9321B8C8524FEEFA5229.

16 https://www.eia.gov/energyexplained/hydropower/hydropower-and-the-environment.php.

Erwan Hesry/Unsplash

Forestry and other land-use changes involve complex linkages between adaptation and mitigation. Forest conservation and increasing forest cover have been among the mitigation options with significant positive effects on adaptation. The benefits of reducing deforestation can be significant on biodiversity, soil and water conservation. Afforestation can have many positive effects, such as soil conservation and flood control in areas with abundant water resources. It can affect the regional climate and reduce the frequency of climate extremes, such as heat waves, which consequently reduce the vulnerability of people and ecosystems and improve adaptation to climate change. Nevertheless, in arid and semi-arid regions, afforestation can reduce water yields significantly, which consequently has adverse effects on irrigation in the agriculture sector, on cooling towers in power generation, and on ecosystem protection. Therefore, the regional conditions and the implementation methods should be taken into account when developing mitigation options and actions.

Furthermore, positive consequences for adaptation have been reported in mitigation projects relating to forestry, including conserving biodiversity and improving local ecosystem services for local communities. However, there are concerns that such projects could restrict the rights and access of local communities to land and forest resources or increase their dependence on unpredictable external funding.[17]

The potential of **the agriculture sector** in emission reduction is significant, with the global mitigation potential estimated to be between 1600 and

17 https://www.cifor.org/fileadmin/fileupload/cobam/ENGLISH-Definitions%26ConceptualFramework.pdf.

Marcin Jozwiak/Unsplash

4200 metric tons of CO_2 equivalent (Mt CO_2 Eq.) per year.[18] All the options that affect the carbon and/or nitrogen cycle of the agroecosystem have the potential to reduce emissions. Carbon sequestration in agricultural soils offers another positive link between adaptation and mitigation. It improves soil properties and nutrient cycling in agroecosystems, thus enhancing both the economic and environmental components of adaptive capacity.

Urban planning studies have identified both synergies and trade-offs of mitigation actions with adaptation. Examples of positive consequences include standards for buildings that support energy efficiency, passive building design (e.g. passive cooling of buildings combined with night ventilation) and using building materials that increase resilience of the building. However, densification of the urban structure in an attempt to reducing emissions from transportation can cause urban heat islands, thus increasing urban temperature.[19]

Additionally, emissions standards and car-sharing schemes in many cities in Europe have reduced car dependency, and has contributed to reducing congestion and pollution, as well as enhanced productivity and well-being of urban residents. In central London, a "congestion charge" has led to CO_2 emission reduction by 20% and reduced daily vehicle journeys by 70,000. [20]

18 https://www.cambridge.org/core/journals/journal-of-agricultural-science/article/synergies-between-the-mitigation-of-and-adaptation-to-climate-change-in-agriculture/20FFDF69A92646BBE7390A2B54B10B58.

19 https://link.springer.com/article/10.1007/s10584-015-1395-1.

20 UNEP Green Economy report https://sustainabledevelopment.un.org/content/documents/126GER_synthesis_en.pdf.

Kyryl Levenets/Unsplash

2.3 Inter-relationships between adaptation and mitigation options and sustainable development, including those under 1.5°C pathways

The integration of adaptation and mitigation responses into sustainable development planning can optimize efforts to achieve climate and sustainable development goals (SDGs). Adaptation options should be designed and implemented while taking into consideration the goal of sustainable development to ensure that adaptation actions at one scale or sector do not lead to inequitable and unsustainable outcomes or increases in vulnerability. For example, increased GHG emissions and water usage can lead to an increased human encroachment onto natural systems and an exacerbation of gender and social inequality.[21] Mitigation options also need to be designed well in order to avoid undermining sustainable development. For example, plantations for bioenergy production, if poorly designed or managed, can encroach on agricultural lands, forests, or indigenous or local ownership.

Some climate change responses aim to find an appropriate mix between mitigation, adaptation, and sustainable development that can lead to "win-win" and "triple-win" by providing positive effects while avoiding potential trade-offs between them. One

21 https://archive.ipcc.ch/report/ar5/wg2/.

Chuttersnap/Unsplash

example that has led to a "triple-win" is a case study from China. The initiative, through water-saving irrigation practices, saved 61.82–129.66 billion cubic metres of water from 2007 to 2009 which accounted for 5.6–11.8% of the national total water consumption, and reduced the total CO_2 emissions by 21.83–47.48 Mt of CO_2, all having positive effects in dealing with climate change and promoting regional sustainable development in China.

Another example of mechanisms with co-benefits, mentioned in the IPCC fifth assessment report in the context of externalities, is REDD+. It refers to "reducing emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries". This mechanism has shown triple-win in some cases by reducing carbon emissions, enhancing livelihoods of forest dwellers, and providing benefits to social equity.

However, not all the projects that aimed to reduce emissions and contribute to sustainable development have resulted in win-win outcomes. An assessment of 16 Clean

Development Mechanism (CDM)[22] projects has shown that the projects could meet 72 per cent of their emission reduction goals, but less than 1 per cent might have contributed significantly to sustainable development in the host countries.[23]

The IPCC, in its fifth assessment report, addressed a range of issues with regard to the integration of adaptation and mitigation actions into sustainable development, including the concept of additionality[24] for mitigation projects, which is needed to make projects attractive to international support. It also highlighted that there is disconnect between access to international adaptation funds and developing countries' development agendas that makes it difficult to mainstream adaptation into development. These issues are discussed in more detail in section five "Challenges, needs, and opportunities".

2.3.1 Linkages under 1.5°C pathways

The IPCC, in its special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, elaborated on adaptation and mitigation options consistent with 1.5°C pathways. These are associated with potential positive effects (synergies) or negative effects (trade-offs) across the SDGs.[25] The report highlighted that the impact of climate change on sustainable development, eradication of poverty and reducing inequalities would be lesser with 1.5°C pathways rather than 2°C, considering that adaptation and mitigation synergies are maximized while trade-offs are minimized.

Adaptation options that are targeted to reduce the vulnerability of human and natural systems will have many synergies with sustainable development and poverty reduction, if well managed and if national contexts and enabling conditions are taken into account. The positive effects include promoting food and water security, reducing disaster risks, improving health conditions, maintaining ecosystem services, and reducing poverty and inequality. The key enabling condition is increased investment in physical and social infrastructure to enhance societies' resilience and adaptive capacity. Trade-offs are also possible between adaptation and mitigation, when limiting global warming to 1.5°C. For example, the encroachment of reforestation or afforestation projects on land that is needed for agricultural production can undermine food security and other dimensions of sustainable development.

Several potential synergies and trade-offs were addressed between mitigation options consistent with 1.5°C pathways and sustainable development (and SDGs). The potential for synergies or trade-offs depends on a range of factors including the composition of the mitigation portfolio, mitigation policy design, and local circumstances and context. Mitigation options that have greater synergies and lesser trade-offs with respect to sustainable development include those that are linked with low energy demand, low material consumption, and low GHG-intensive food consumption. The report stated that the potential for synergies is particularly larger than for trade-offs in the energy-demand sector. It also mentioned that mitigation consistent with 1.5°C pathways creates risks for sustainable development in regions highly dependent on fossil fuels for revenue and employment generation; hence, it suggested that policies should be developed to promote diversification of the economy and the energy sector in addressing the associated challenges.

The IPCC special report on 1.5°C identified that ocean changes are happening faster

22 CDM is a mechanism under the Kyoto Protocol to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments under Article 3.

23 Sutter and Parreno (2007) in the IPCC AR5.

24 Additionality under the CDM was defined by decision 3/CMP.1 para 43: "A CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity."

25 https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers/.

and with more intensity, and that significant reductions in GHGs are needed to avoid irreversible changes in ocean ecosystems and the reduction of capacity of oceans to absorb carbon dioxide from the atmosphere. The IPCC Special report on oceans and cryosphere in a changing climate (SROCC) identifies that Small Island States, coastal megacities, urban atoll islands and coastal communities are on the frontline facing increasing risk of impacts of sea level rise and extreme events, such as tropical storms and storm surge. Enabling climate resilience and sustainable development depends critically on urgent and ambitious emission reductions coupled with coordinated sustained and increasingly ambitious adaptation actions. Most ocean-based local adaptation and mitigation measures have limited effectiveness to mitigate climate change and reduce its consequences at the global scale, however, they are useful to implement because they address local risks, often have co-benefits such as biodiversity conservation, and have few adverse side effects. For example, ecosystem-based adaptation responses, including coral conservation and restoration, have co-benefits for mitigation through carbon sequestration as well as for sustainable development, such as income from tourism, enhanced fishery productivity, improved water quality and biodiversity. Ocean-based carbon dioxide removal at the global scale has potentially large negative ecosystem consequences.

The report highlighted robust synergies between mitigation options consistent with 1.5°C pathways and multiple SDGs, “particularly for the SDGs 3 (health), 7 (clean energy), 11 (cities and communities), 12 (responsible consumption and production) and 14 (oceans) (very high confidence). Some 1.5°C pathways show potential trade-offs with mitigation for SDGs 1 (poverty), 2 (hunger), 6 (water) and 7 (energy access), if not managed carefully (high confidence)”.

3 LINKAGES UNDER THE UNFCCC AND WITH OTHER INTERNATIONAL AGENDAS

This section describes how linkages between adaptation and mitigation have been addressed under the UNFCCC, the Kyoto Protocol, and the Paris Agreement, including relevant decisions. The linkages are classified into two groups, first those that explicitly address synergies between adaptation and mitigation, and the second group presents the link between adaptation and/or mitigation with sustainable development and/or some dimensions of it.

Additionally, the section extends to include linkages between adaptation and mitigation actions and sustainable development, biodiversity, desertification, and food and agriculture under the SDGs, CBD, UNCCD, and FAO respectively. Figure 1 illustrates the linkages discussed in this section.

3.1 Linkages under the UNFCCC

Objectives of adaptation and mitigation differ. While mitigation addresses the causes of climate change and aims to reduce emissions, adaptation deals with reducing the negative impacts of climate change, and if any "seeks to exploit beneficial opportunities".

Linkages between adaptation and mitigation

Linkages between adaptation and mitigation have been addressed under the Paris Agreement. An inverse correlation between them has been reflected in **Article 7** of the Paris Agreement. Paragraph 4 of Article 7 recognizes the interlinkage between the current need for adaptation and the levels of mitigation achieved; that is, greater levels of mitigation can reduce the need for additional adaptation efforts.[26] **Article 5** of the Paris Agreement encourages Parties to take action to implement and support alternative policy approaches, such as joint adaptation and mitigation approaches for the integral and sustainable management of forests, while reaffirming the importance of incentivizing, as appropriate, non-carbon benefits associated with such approaches.[27] Moreover, **Article 4** (para 7) of the Paris Agreement states that mitigation co-benefits resulting from Parties' adaptation actions and/or economic diversification plans can contribute to mitigation outcomes.[28]

The linkages are also addressed in a number of COP decisions, for example:

a. COP 21 also recognized the social, economic and environmental value of voluntary

26 See the Paris Agreement, Article 7, para 4.

27 See the Paris Agreement, Article 5, para 2.

28 See the Paris Agreement, Article 4, para 7.

mitigation actions and their co-benefits for adaptation, health and sustainable development.[29]

b. In the decision relating the Koronivia joint work on agriculture, the Parties and observers were invited to submit their views on issues related to agriculture and other future topics including methods and approaches for assessing adaptation, adaptation co-benefits and resilience.[30]

c. In the decision related to the technical examination process on mitigation in the period 2016–2020, the COP requested to reflect the mitigation benefits and co-benefits of policies, practices and actions for enhancing mitigation ambition, as well as on options for supporting their implementation.[31]

d. In defining the technical examination process on adaptation, the COP requested to include consideration of actions that could enhance economic diversification and have mitigation co-benefits.[32]

e. In outlining the elements of adaptation communications, the CMA included "Adaptation actions and/or economic diversification plans, including those that result in mitigation co-benefits."[33]

Linkages between adaptation and mitigation actions and sustainable development

Linkages between climate change adaptation and mitigation actions and sustainable development have been also addressed in **the Convention, the Kyoto Protocol, and the Paris Agreement.** In the Convention, for example, the relationship between mitigation, adaptation and sustainable development has been reflected in **Article 2**. The article states that mitigation actions should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner.[34] Additionally, under the **commitments of the Convention**, Parties "shall take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate change." [35] An example of linkages is the **CDM under the Kyoto Protocol**, the purpose of which is to assist developing countries in achieving sustainable development and in contributing to the ultimate objective of the Convention.[36]

Article 2 of the Paris Agreement aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty. It also notes that adaptation and low greenhouse gas development should be undertaken in a manner that does not threaten food production.[37]

3.2 Linkages with other international agendas

The 2030 agenda for sustainable development and the Rio conventions (CBD, UNCCD, UNFCCC) address climate change in their activities and are working together to enhance effective climate actions and to achieve sustainable development. In addition, climate change is considered a cross-cutting corporate priority by the FAO and this has been reflected in the FAO's recent strategy on climate change.

29 See Decision 1/CP.21 para 108. Available at https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf#page=2.
30 See decision 4/CP.23. Available at https://unfccc.int/sites/default/files/resource/docs/2017/cop23/eng/11a01.pdf.
31 See Decision 1/CP.21 para 111. Available at https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf#page=2.
32 See Decision 1/CP.21 para 127 (b).
33 See Decision 9/CMA.1, annex, bullet (f). Available at https://unfccc.int/sites/default/files/resource/9-CMA.1_English.pdf.
34 See the United Nations Framework Convention on Climate Change, Article 2: Objective.
35 See the United Nations Framework Convention on Climate Change, Article 4: Commitments, para 1(f).
36 The Kyoto Protocol, Article 12.
37 See the Paris Agreement, Article 2.

Resolution 70/1 of the United Nations General Assembly calls for a plan for action, with 17 goals focusing on three dimensions: sustainable development, comprising the economic, social and environmental.[38] Goal 13 inspires urgent actions to combat climate change and its effects. The CBD process includes specific activities on biodiversity and climate change. Decision V/3 of the fifth session of the COP to the CBD on marine and coastal biodiversity included adaptation within the framework of "priority areas for action on coral bleaching",[39] and decision VIII/30 on "Biodiversity and climate change: guidance to promote synergy among activities for biodiversity conservation, mitigating or adapting to climate change and combating land degradation", the COP to the CBD encouraged the development of rapid assessment tools for the design and implementation of biodiversity conservation and sustainable use activities that contribute to adaptation. It also encouraged Parties and other governments, when addressing research needs and activities on the impacts of climate change on biodiversity, to involve indigenous and local communities and other relevant stakeholders, particularly on issues related to ecosystem health, human health, traditional knowledge, and livelihoods.[40]

UNCCD's Article 10 addresses, through the formulation of National Action Programmes, the implementation of adaptation measures to mitigate the effects of drought, including drought early warning, assisting environmentally displaced persons, strengthening of drought preparedness and management, establishment of food security systems and of alternative livelihood projects, and development of sustainable irrigation programmes for both crops and livestock.[41] The FAO's recent strategy on climate change focuses on, inter alia, improved integration of food security, agriculture, forestry, and fisheries within the international agenda on climate change through reinforced FAO engagement.[42]

Francesco Ungaro/Unsplah

38 https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf.
39 https://www.cbd.int/decision/cop/default.shtml?id=7145.
40 https://www.cbd.int/doc/decisions/cop-08/cop-08-dec-30-en.doc.
41 http://catalogue.unccd.int/936_UNCCD_Convention_ENG.pdf.
42 FAO Strategy on Climate Change, available at http://www.fao.org/3/a-i7175e.pdf.

FIGURE 1. LINKAGES UNDER THE UNFCCC AND WITH OTHER INTERNATIONAL AGENDAS

LINKAGES WITH INTERNATIONAL AGENDAS

CONVENTION ON BIOLOGICAL DIVERSITY

Decision V/3 on marine and coastal biodiversity, and decision VIII/30 on synergies between biodiversity and climate change

UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION

Article 10 of UNCCD on measures to mitigate the effects of drought (early warning systems, assisting environmentally displaced persons, food security systems and alternative livelihood projects).

FOOD AND AGRICULTURAL ORGANIZATION OF THE UNITED NATIONS

FAO strategy on climate change (focusing on food security, forestry agriculture and fisheries)

MITIGATION & ADAPTATION LINKAGES WITHIN THE UNFCCC

CONVENTION

Article 2: Mitigation actions to allow adaptation of ecosystems and sustainable development

Article 4: Taking climate change into account in social, economic and environmental policies

KYOTO PROTOCOL

Article 12: Clean Development Mechanism (CDM) to achieve sustainable development

PARIS AGREEMENT

Article 2: Climate change in the context of sustainable development

Article 4: Mitigation co-benefits from adaptation and/or economic diversification

Article 5: Joint adaptation and mitigation for sustainable management of forest management

Article 7: Link between need for adaptation and level of mitigation

KEY RELEVANT COP DECISIONS

1/CP.21, paragraph 108: Recognizing the social, economic and environmental value of voluntary mitigation actions and their co-benefits for adaptation, health and sustainable development

4/CP.23: Koronivia joint work on agriculture

1/CP.21, paragraph 127: Identifying adaptation actions that could enhance economic diversification and have mitigation co-benefits

9/CMA.1, annex, bullet f: Including adaptation actions that result in mitigation co-benefits into the elements of adaptation communications

SUSTAINABLE DEVELOPMENT GOALS

RESOLUTION 70/1 OF THE UNITED NATIONS GENERAL ASSEMBLY, LIST:

GOAL 1: No Poverty

GOAL 2: Zero Hunger

GOAL 3: Good Health and Well-being

GOAL 4: Quality Education

GOAL 5: Gender Equality

GOAL 6: Clean Water and Sanitation

GOAL 7: Affordable and Clean Energy

GOAL 8: Decent Work and Economic Growth

GOAL 9: Industry, Innovation and Infrastructure

GOAL 10: Reduced Inequality

GOAL 11: Sustainable Cities and Communities

GOAL 12: Responsible Consumption and Production

GOAL 13: Climate Action

GOAL 14: Life Below Water

GOAL 15: Life on Land

GOAL 16: Peace, Justice, and Strong Institutions

GOAL 17: Partnerships for the Goals.

4 LINKAGES IN REPORTS SUBMITTED BY PARTIES UNDER THE UNFCCC AND CLIMATE PROJECTS

4.1 Plans and strategies

This section offers insights gained from reports submitted by Parties to the UNFCCC drawn from three sources, comprising the NAPs, NDCs, and National Communications. Parties addressed the linkages between adaptation and mitigation predominantly in the form of potential mitigation co-benefits resulting from adaptation actions and vice versa. They also mentioned co-benefits of adaptation and mitigation actions, in a broader context, for health and wellbeing of people, poverty reduction, low-emission economy and climate-resilient development. Synergies are being sought across several sectors, including energy, agriculture and livestock, forestry, ecosystems, and urban development and infrastructure.

A study on linkages between adaptation and mitigation in long-term strategies showed that least developed countries (LDCs), countries that are particularly vulnerable to climate change, will face the largest impacts of climate change before 2050, or any time before the benefits of mitigation materialize. Therefore, the impacts can only be avoided by adaptation. The study also revealed that higher energy prices could have negative consequences for their resilient development, suggesting that "the primary narrative for LDCs is likely to be towards integrating cost effective mitigation in long-term LDC adaptation plans".[43]

4.1.1 Energy

Parties reported adaptation options that deliver potential co-benefits for mitigation, and mitigation options that deliver potential adaptation co-benefits in the energy sector. Mitigation measures with adaptation co-benefits include those that result in socio-economic benefits (e.g. job creation and increased rural household incomes), and improved electricity access and security. For example, one Party reported in its NDC that about 6000 green jobs can be created by 2030 through implementing energy efficiency measures in buildings and introducing low-carbon energy supply technologies.

Examples of adaptation measures with mitigation co-benefits in the energy sector include energy efficiency and the role of renewable energy development in increasing the resilience of the energy, land use, water and health sectors. One Party estimated that its adaptation measures would generate emission reductions of up to 130 Mio t CO_2eq.

43 Discussion paper by GIZ, available at https://www.weadapt.org/system/files_force/18wk_giz.pdf?download=1.

BOX 1. NITROGEN USE EFFICIENCY IN UK AGRICULTURE

Nitrous oxide is an important greenhouse gas with a global warming potential of 265–298 times that of carbon dioxide for a 100-year timescale. The application of nitrogen fertilizer to agricultural soils, which has been driven by the need for greater crop yields, is the main contributor to N2O emissions. The UK Department for Environment, Food and Rural Affairs (Defra) has invested significant resources to improve understanding about uncertainties associated with estimating emissions from soils and has revised its guidelines on agricultural practices and efficient use of fertilizers.

Implementation of changes in agricultural management such as reducing nitrogen fertilizer, improved timing of mineral fertilizer nitrogen application, improving land drainage and adopting systems less reliant on inputs can increase the economic efficiency of farming systems as well as reducing emissions. A study estimated a 4.3t CO_2 equivalent per hectare per year GHG reduction in the UK as a result of the improvement in agricultural management.

Sources:
https://unfccc.int/sites/default/files/resource/19603845_United%20Kingdom-NC7-BR3-1-gbr%20NC7%20and%20BR3%20with%20Annexes%20%281%29.pdf;
https://www.tandfonline.com/doi/full/10.1080/00380768.2012.733869.

4.1.2 Agriculture

With regard to the agriculture sector, countries reported the development of some guidelines/ adaptation measures for agricultural programmes and action plans that take account of GHG mitigation to increase the sustainability of the sector. Frequently highlighted adaptation measures offering co-benefits for mitigation include farming practices that contribute to reducing GHG emissions and improved livestock production practices (see Box 1 for an example of reducing nitrogen fertilizer in emission reduction). Engagement in the process of climate-smart agriculture (CSA) was also addressed in the context of food security and increasing resilience and decreasing emissions.

4.1.3 Forestry and Biodiversity

Some countries highlighted, while supporting efforts to combat deforestation, that reducing deforestation has climate change mitigation benefits and it helps reduce poverty and protect biodiversity, with corresponding benefits for resilience and adaptation. Intervention strategies for reducing deforestation and forests degradation were mentioned as considerations for prioritization of adaptation measures.

Adaptation measures aimed at biodiversity conservation and soil and water protection addressed by some Parties to provide co-

BOX 2. PROTECTION OF EXISTING MANGROVES FROM DEFORESTATION IN BELIZE

Belize in its NDC recognized that many mitigation actions will produce co-benefits that promote adaptation, reduce the risk of disasters, and enhance resilience to climate change. Forest protection and replanting of mangroves are expected to protect the coastline against the impact of storms and soil erosion. Mangrove forests are also habitats for regional fish stocks and maritime ecosystems. Protection of existing mangroves from deforestation and restoration of lost mangroves have the carbon sequestration potential of around 11.2Gg carbon dioxide annually and removing additional 2.2 – 35Gg CO2 per year between 2020 and 2030.

Sources:
https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Belize%20First/BELIZE's%20%20NDC.pdf.

benefits for GHG mitigation. Protection of marine and terrestrial ecosystems, drought-tolerant species, wetlands, and mangroves (see Box 2 for an example of protecting mangroves in Belize) were among the adaptation measures of biodiversity conservation with positive effects in creating carbon sinks. Many countries recoginze the co-benefits of adaptation and mitigation with sustainable development. For example, one Party referred to its plan of protecting all remaining wetlands and watersheds with carbon sequestration potential by 2030.

Parties recognized the role of ecosystem services such as ecosystem-based adaptation (EbA) in delivering multiple benefits beyond adaptation. Fiji in its NAP emphasised the promotion of EbA and its role in the alignment of NAP with national frameworks and plans, and the co-benefits it can offer for disaster risk reduction and mitigation (Box 3).

BOX 3. PROMOTION OF ECOSYSTEM-BASED ADAPTATION OPTION IN FIJI'S NAP

Climate change has played a role in deterioration of ecosystems in Fiji, with ocean warming and acidification have led to coral bleaching events. The deterioration of ecosystems and natural resources had negative effects on biodiversity, food security, livelihoods, and protection against storms. An assessment of ecosystem-based adaptation actions in Fiji showed that they were cost-effective and that they have provided social, economic, and environmental co-benefits as well as mitigation co-benefits.

Fiji's NAP's is viewed as the process of implementing the adaptation component of the new National Climate Change Policy (NCCP). The promotion of EBA helps to align the NAP with the NCCP and to highlight values associated with ecosystems and the services they provide to be incorporated into sub-national adaptation planning.

The promotion of EBA also contributes towards aligning the NAP with other national frameworks and plans as well as international agreements. These include (1) the Integrated Coastal Management Framework, (2) National Biodiversity Strategy and Action Plan, (3) the State of the Environment reporting, as well as (4) the United Nations Convention on Biological Diversity.

Sources:
https://www4.unfccc.int/sites/NAPC/Documents/Parties/National%20Adaptation%20Plan_Fiji.pdf.

4.1.4 Urban development and transport

Urban development and architecture was mentioned to have the potential to design solutions combining adaptation and mitigation in a manner towards low carbon and sustainable development. One Party identified great potential of synergies in this field, referring to the strategic plan of its ministry of environment and urbanization. The strategy consists of three pillars (environmental, urbanization, and institutional capacity), integrating environmental sustainability and climate change actions into the urbanization strategies and policies.

Another country identified a number of measures for emission reduction to be implemented between 2015 and 2030. Among the intended actions is the development of the road network for public transport. In addition to GHG emission reduction, this activity will lead to a reduction in other pollutants (nitrogen oxides and sulphur oxides) and improve air quality which will consequently have co-benefits for human health.

4.1.5 Cross cutting sectors

Several Parties cited climate change as a cross-cutting theme, hence suggesting that policies

and strategies for adaptation and mitigation should be integrated into development policies and programmes. This would enhance synergies with existing relevant development policies, build national capacity for low-emission development, and increase efficiency and cost-effectiveness across multiple sectors, including provisions for cross-cutting issues for data collection, monitoring and assessment.

Countries' current efforts on disaster risk reduction, such as improvement of extreme weather events monitoring systems, were mentioned to be beneficial for adaptation to climate change. One Party stated that one of its NAP's objectives is to enhance synergies between adaptation and mitigation actions, and to achieve a low carbon climate resilient economy through mainstreaming **disaster risk reduction** approaches in various sectors.

Most reported their provision of public bilateral and multilateral **financial support** to be divided into mitigation, adaptation and cross-cutting. For example, one Party mentioned that most public climate finance supported cross-cutting activities due to substantial contributions to activities through multilateral and other channels that support both adaptation and mitigation, with € 913 million spent in 116 cross-cutting activities in the period between 2013 and 2016.

Some countries recognized that some climate change mitigation activities have the potential for adaptation co-benefits, so in their prioritizing adaptation options, mitigation co-benefits were considered as one of the criteria. One NAP mentioned that some **technologies** for mitigation may relate to sectors sensitive to climate change impacts and help meet their adaptation requirements.

One Party in its NAP acknowledged the reduction of greenhouse gas emissions as being critical for addressing the adverse effects of climate change and for strengthening resilience. This NAP intends to focus on **capacity building** of researchers with the aim to produce knowledge and deepen understanding about emission factors across sectors.

The importance of addressing adaptation options that involve trade-offs was underscored by a few Parties. This was suggested to be undertaken through evaluation of the options using, among some other methods, participatory multi-criteria analysis to determine trade-offs and to find alternative options, with the aim to balance the needs of all stakeholders. One NAP, while recognizing the co-benefits of some mitigation activities for adaptation and enhanced resilience, addressed the negative impacts of some mitigation policies on its economy; for example, carbon taxes and increased costs of long distance aviation may result in a potential decline in the tourism industry.

4.2 Climate projects

The Convention established a financial mechanism under its Article 12. Funds are currently being provided through the Adaptation Fund (AF), the Global Environment Facility (GEF), the Least Developed Countries Fund (LDCF), the Special Climate Change Fund (SCCF), and the Green Climate Fund (GCF).

The Adaptation Fund has a clear mandate to focus on adaptation only. Even though the mitigation co-benefits are not sought explicitly, many agriculture and EbA projects can offer co-benefits for mitigation. For example, a project, funded by the AF, in Ecuador consists of a component of conservation of vegetation cover on an area of 230,000 ha, through active sustainable forest management and the introduction of conservation technologies.[44]

The GEF through the three GEF-7 cross-cutting Impact Programs (Sustainable Cities; Food Systems, Land and Restoration; and Sustainable Forest Management) considers linkages between mitigation options and climate resilience measures, to promote and harness synergies across the various multilateral environmental agreements in an integrated manner.

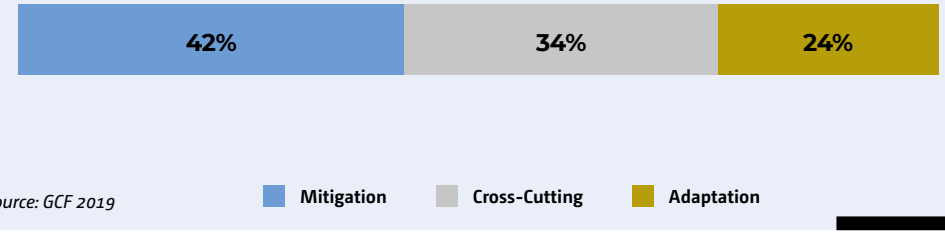
44 https://www.adaptation-fund.org/project/increasing-adaptive-capacity-local-communities-ecosystems-hydroelectric-systems-rio-blanco-upper-watershed-toachi-pilaton-watershed/.

The GCF has a cross-cutting portfolio to allow for funding cross-cutting projects and programmes in developing countries. Cross-cutting projects represent about 34% of the portfolio providing both adaptation and mitigation ancillary benefits to varying degrees. It is important to mention that the breakdowns by adaptation and mitigation for cross-cutting projects are preliminary estimates, and the GCF is currently reviewing its methodology to improve segregation of adaptation and mitigation components and the discount rate.

Following are mitigation-adaptation linkages illustrated by cross-cutting projects, as well as their likely co-benefits.

Contribution to institutional transformation, climate investment and regulatory policy: The GCF's cross-cutting programmes have provided an investment in the institutional and human capacity needed for developing countries to fully integrate climate information and risk into planning, policy frameworks, project design and delivery. This would also support the evolution of NDCs and country priorities over time. For example, projects in Morocco, Pakistan and Mongolia, receive multi-year funding to target building of management capacities of institutional stakeholders, elected representatives and professional organizations. The likely benefits of building long-term capacity also support climate policy coherence between adaptation and mitigation objectives and policies across agriculture, water and energy sectors.

FIGURE 2. GCF PROJECTS FUNDED BY TARGET AREA (% OF TOTAL FUNDING)



Data Source: GCF 2019

The climate mitigation strategy of the GEF Small Grants Program (SGP) aims to scale up low-carbon, viable technologies and approaches to improve community **energy** access. The SGP has supported more than 23,500 projects implemented by civil society and community-based groups in 131 countries. The SGP portfolio has the "potential for carbon emissions reductions through initial catalytic financing aimed at generating co-benefits, such as increasing climate resilience, reducing poverty, enhancing gender equality, and achieving relevant SDGs".[45]

Cross-cutting projects targeting the **agriculture sector** offer several opportunities for support policies to build synergies across sectors, e.g. agrifood/water/energy nexus. Cross-cutting projects in the agriculture sector in El Salvador, Cambodia, Guatemala, Mexico and Rwanda are addressing smallholder farmer vulnerability to climate shocks, by leveraging investments from the private sector for building resilience of agricultural value chains. Projects in Guatemala and Mexico also leverage insurance and risk guarantee/finance markets, and likely co-benefits include crowding-in of external finance via creation of a risk sharing facility to unlock innovative and scalable financial instruments for micro-, small- and medium-sized enterprises.[46]

Within the **water sector**, significant challenges remain in developing countries in water resource

45 Report of the GEF to COP 25 http://www.thegef.org/sites/default/files/council-meeting-documents/EN_GEF.C.55.Inf_.XX_UNFCCC_CoP_Report.pdf.

46 GCF. 2017. FP048 Climate-Smart Agriculture (CSA) Risk Sharing Facility for MSMEs. Songdo: Green Climate Fund.

management, efficiency of use, agricultural irrigation practices, wastewater treatment and sanitation.[47] GCF interventions in the water sector aim to promote a synergistic approach to tackling the water-energy-food security nexus. For example, in Barbados, Kiribati and the Solomon Islands, projects have enabled the scaling up of innovative financing models and adoption of technologies by leveraging partnerships with national water, sanitation and energy sectors private sector in developing countries. The likely co-benefits of the water and energy projects include access to low-emission power, water security and energy storage and improved human health and wellbeing.[48]

Ecosystem-based projects conserve, enhance and protect ecosystems, benefiting the clean energy sector, preserving agricultural yields in a changing climate and avoiding displacement of agriculture to forested areas. For example, projects in Niger, Peru and Bhutan aim to facilitate forestry and land use climate mitigation (carbon sinks and reservoirs), better land-use planning and management of wetlands, disaster risk management, and commercial bio-businesses of non-timber forest products. A large component of the Peru project also supports bio-businesses, including development of business plans, marketing and management, development of solar energy and potential livelihood benefits for local communities.[49] Similarly, in Bhutan, the development of protected areas helps to conserve carbon and has co-benefits such as protection of ecosystem functions and services, natural resource management and income and livelihoods.[50]

A project in Mauritania aims to increase the adaptive capacity of rural communities in three arid regions of Adrar, Inchiri, and Trarza. The project will directly benefit 3,500 people and place 1,300 hectares of land under climate resilient management through several adaptation measures, including reducing soil erosion, improving water supply, providing non-forest timber products, and improving food security. The project includes an EbA approach which is innovative in the Sahelian and Saharan ecosystem context. In addition to reducing climate vulnerability, this project also provides co-benefits for mitigation, including through carbon sequestration.[51]

Given its cross-cutting nature, **cities and urban growth** is an area where adaptation and mitigation can synergize across sectors and the co-benefits can be maximized by strengthening the resilience of urban infrastructure while reducing associated emissions. For example, in Mongolia, the Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Project is supporting the creation of eco-districts in these highly climate-vulnerable and polluting areas (traditional Mongolian dwellings).[52] The eco-districts are low-carbon, climate resilient and affordable. This is being done through low-cost green infrastructure, public facilities, and social housing units. Many of the co-benefits include the improvement of local air quality and the associated health benefits (by reducing greenhouse emissions and improving air pollution).

47 GCF. 2019. Adaptation: Accelerating action towards a climate resilient future. Green Climate Fund working paper No.1. Songdo: Green Climate Fund.
48 GCF. 2018. FP091 South Tarawa Water Supply Project. Songdo: Green Climate Fund.
49 GCF. 2015. FP001 Building the Resilience of Wetlands in the Province of Datem del Marañón, Peru. Songdo: Green Climate Fund.
50 GCF. 2017. FP050 Bhutan for Life. Songdo: Green Climate Fund.
51 Report of the GEF to COP 25 http://www.thegef.org/sites/default/files/council-meeting-documents/EN_GEF.C.55.Inf_.XX_UNFCCC_CoP_Report.pdf.
52 GCF. 2018. FP077 Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Project (AHURP). Songdo: Green Climate Fund.

Introduction and background
A review of scientific literature
Linkages under the UNFCCC and with other international agendas
Linkages in reports submitted by Parties and climate projects
Challenges, needs and opportunities
Conclusion

5 CHALLENGES, NEEDS AND OPPORTUNITIES

This section addresses challenges, needs, and opportunities, drawn from the scientific literature and projects and reports from Parties, when linkages between adaptation and mitigation actions and polices were sought and/or when integration of adaptation and mitigation projects with sustainable development were desired.

5.1 Challenges

5.1.1 Difficulties in achieving win-win and triple-win

Some climate change interventions aim to integrate adaptation and mitigation into goals of sustainable development with the hope of achieving a triple-win, by simultaneously reducing emissions and increasing adaptive capacity of communities in a manner resulting in low-emission climate-resilient economy and development. However, enhancing positive synergies between mitigation, adaptation, and sustainable development while minimizing potential trade-offs between them has been difficult in practice, with CDM being the most prominent example of not achieving win-win goals. Research has shown that triple-win interventions, even when relatively successful, may result in unequal distribution of benefits across mitigation, adaptation, and sustainable development due to different burden of trade-offs borne by each goal (IPCC AR5).

Furthermore, research suggests that too much emphasis on the integration of adaptation and mitigation into SDGs could result in diverting attention from important issues, such as poverty reduction, and that the focus should be on mainstreaming climate change into development policy and planning, rather than integration in climate change projects or policies. (IPCC AR5).

5.1.2 Complementarity vs. synergic

A study on the inter-relationships between adaptation and mitigation in the land use sector has argued that current climate policies focus on complementarity rather than a synergic approach, by focusing on mitigation projects providing adaptation co-benefits and adaptation projects with co-benefits for mitigation. It explains that in the complementarity context, either adaptation or mitigation is used as a point of entry and the other a co-benefit (minor), and that in this approach competition for resources between adaptation and mitigation is unavoidable. However, the synergic approach focuses on the optimal mix of adaptation and mitigation interventions (in contrast to prioritization of interventions in complementarity) in a functionally sustainable system. [53]

An example of a synergies model is the experience of the Ngitili system in Tanzania that serves both adaptation and mitigation functions. Ngitili is a traditional fodder bank system used to conserve pasture for the dry season in Tanzania through regeneration and conservation of trees on cropping and grazing lands. The practice was

53 https://www.ncbi.nlm.nih.gov/pubmed/25047275.

abandoned in the 1920s and was reintroduced in the 1980s and promoted thereafter to reduce poverty and promote livelihood security through ecosystem restoration efforts. The reintroduction of Ngitili was supported by a number of policies and measures taken by the national government, including institutionalization of a region-wide programme, and the enactment of the 1997 Land Policy and the Land and Village Land Acts of 1999. Institutionalization of Ngitili received financial support from the Norwegian government and technical support from the World Agroforestry Centre in the 1980s. Strategic measures taken by the national government included intense engagement of local communities as well as creation of village environmental committees that had a strong voice in the dialogues and decisions on matters relating to the programme. The re-establishment of Ngitili significantly contributed to addressing climate change issues though the practice which was neither adaptation nor mitigation but rather a multifunctional approach consisting of engagement of the local communities in the programme, the multiple financial mechanisms, and the sustained technical support.[54]

5.1.3 Complex process

Another challenge with seeking synergies between adaptation and mitigation is creating complexities in projects and processes. For example, integrating adaptation and mitigation projects requires engagement with large group of stakeholders with diverging expertise and interests, more reporting requirements, and dealing with more objectives, hence it brings difficulties in coordinating such projects. [55]

Even where integration of adaptation and mitigation projects is reasonably well coordinated, bureaucratic complexities can impede the implementation of projects; for example, in Mexico, lack of resources and limited societal involvement constrain the actual implementation of adaptation and mitigation actions despite the governmental discourse supporting climate change policy.[56]

5.1.4 Access to funding

Along with the issue of the complex process associated with integration of adaptation and mitigation projects, there is an accompanying challenge in applying and reporting to multiple climate funds. This can add a burden for beneficiary countries and project developers with low technical expertise and awareness and widen the uneven distribution of climate finance between least developed countries and other countries.[57]

Moreover, the challenge of fulfilling additionality requirements in accessing financial support has been discussed in the IPCC's AR5. The additionality concept takes the position that financial support should be encouraged for mitigation projects that reap global environmental benefits in addition to what would be happening in development processes otherwise. It was stated that this concept has been applied in financial support for adaptation as well.

A study focusing on additionality in the CDM suggests that the investment additionality tests should be dropped where it is not possible to be used, such as in the case of green-field[58] projects.[59]

5.1.5 Challenges with mainstreaming

Despite all the challenges mentioned above, there is mounting consensus to integrate climate projects and policies with development. However, research focusing on the National Adaptation Programmes of Action (NAPAs) and the Strategic Programmes for Climate Resilience (SPCRs) has found this difficult due to lack of

54 https://www.ncbi.nlm.nih.gov/pubmed/25047275.
55 http://hal.cirad.fr/cirad-01213126/document.
56 https://archive.ipcc.ch/report/ar5/wg2/.
57 http://hal.cirad.fr/cirad-01213126/document.
58 The *Greenfield project* refers to a work which is not following a prior work.
59 https://oxfordclimatepolicy.org/publications/documents/EV44.pdf.

coordination between government sectors, lack of technical capacity, and mismatches in short-term adaptation interventions and long-term development goals.

Furthermore, a main challenge for developing countries in mainstreaming of climate adaptation into development is the disconnect between the countries' development agendas and global adaptation funds. This can hinder the progress of local organizations that integrate climate change considerations into development priorities.

5.2 Needs

5.2.1 Monitoring and evaluation

The CBD, in its technical report on the integration of biodiversity considerations into the implementation of the UNFCCC and the Kyoto Protocol, highlights the need for baseline data and monitoring systems in order to measure the impact of mitigation projects such as CDM and joint implementation on biodiversity. For example, CDM projects in Belize and Costa Rica can monitor and measure carbon and certain aspects of biodiversity due to the availability of data, whereas the Sudan project discontinued the biodiversity inventory and monitoring because of resource constraints.

In the view of current debates on the institutional arrangements that attempt to combine mitigation and sustainable development (e.g. CDM) not achieving win-win goals, the IPCC fifth assessment report indicates "the need for rapidly developing means for evaluating, changing, and improving current policy instruments and mechanisms".

5.2.2 A set of international environmental and social standards

The CBD emphasizes the importance of developing a set of international environmental and social standards that can be used consistently to ensure that mitigation projects are not adversely affecting biodiversity and local communities of the host countries. This would assist countries to implement mitigation projects in a socially, economically and environmentally sustainable manner, which is also consistent with the provision of the Marrakesh Accords "affirming that it is the host Party's prerogative to confirm whether an Article 6 project activity assists it in achieving sustainable development".

5.2.3 Further research needed on the relationship between mitigation, adaptation, and sustainable development

Integration of adaptation and mitigation into sustainable development is a relatively new area and more research is required to improve understandings of the relationship between them, particularly with regard to understanding synergies and trade-offs in a wide variety of regional and sectoral contexts, to inform strategies, decision making and actions.

Although all sectors would benefit from more research that sheds light on the matter, studies on agriculture revealed that challenges facing the agriculture sector are three-fold: to increase agricultural productivity to support food security, to reduce emissions, and to adapt to a warmer and more variable climate. Hence, there is an urgent need for scientific research, innovation, transformation of knowledge at all levels to address this matter.

Research is also required to identify the right financial mechanism or right criteria for enabling the flow of global funds to support climate actions while considering the importance of adaptation and mitigation actions that are in line with sustainable development.

5.3 Opportunities

5.3.1 Joint implementation of climate projects and policies with biodiversity and desertification control projects

Opportunities exist to implement mutually beneficial activities that take advantage of the synergies between the UNFCCC, the Kyoto Protocol, the CBD and broader national development objectives. A UNDP-GEF project

on "Harmonization of Information management for improved knowledge and monitoring of the Global environment in Georgia" is intended to develop capacities in Georgia for an effective national environmental management framework that addresses different articles under the UNFCCC, UNCCD and CBD.[60]

There is room for improvement in coordination among sectors at the national level and in the design of policy measures that seek potential synergies between national economic development objectives and environmentally focused policies to make the joint implementation of climate and biodiversity projects possible.

The IPCC special report on "climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems" highlighted that actions to combat desertification, including agroforestry, agricultural diversification, and improved cropland, gazing land, and livestock management, can contribute considerably to climate change adaptation with mitigation co-benefits. They can also be particularly useful for biodiversity conservation, with sustainable development co-benefits to society.

5.3.2 Benefits to institutions

Integration of adaptation and mitigation policies and actions has institutional benefits for countries, including by creating new partnerships, encouraging collaboration among practitioners and between national ministries, building capacity at different levels, and discourses between development partners and beneficiary countries. [61]

5.3.3 Application of appropriate analytical tools and instruments

Employment of appropriate methods, for example impact assessments, that can assess both adaptation and mitigation has been emphasised in Article 4 of the Convention.[62] The CBD has illustrated the application of environmental impact assessments in several case studies and the influence of such assessments in informing policy. For example, the application of strategic environmental assessments in Finland led to a request by the Parliament for inclusion of longer-term analyses and a broader spectrum of scenarios in its climate change strategy, while scenarios initially chosen for the strategy had been too narrowly defined.

Markus Winkler/Unsplah

60 https://www.thegef.org/project/harmonization-information-management-improved-knowledge-and-monitoring-global-environment.

61 http://hal.cirad.fr/cirad-01213126/document.

62 See the UNFCCC, Article 4, paragraph 1(f).

5.3.3 Low hanging fruit in the land-related sectors

A study (in 2015) which interviewed representatives of climate funds on how they perceive an integrated adaptation-mitigation approach showed[63] consistent findings with the discussions of the IPCC fourth assessment report,[64] suggesting that opportunities for synergy between adaptation and mitigation are greater in land-related sectors. Most participants believed that adaptation measures in mitigation projects, especially with regard to the land sector, could address climate risks and making mitigation projects more resilient, and consequently have benefits for local communities and project developers. In sharing their views, they mentioned REDD+ projects and that these projects could not be successful without integrating adaptation measures such as increasing the resilience of forest-dependent local communities, green infrastructure for coastal protection e.g. mangroves, and forest conservation in preventing landslides and floods.[65]

Moreover, consideration of community livelihood under the CDM was considered important in the success of the projects. For example, success of the CDM projects in Costa Rica and Sudan was mentioned to be as result of combining key local development and livelihood concerns with those relating to carbon sequestration and biodiversity conservation. On the other hand, the restrictions imposed on the livelihoods of the local communities in the case of Uganda/Netherlands almost led to project failure.

Curioso Photography/Unsplash

63 http://hal.cirad.fr/cirad-01213126/document.

64 Klein RJT et al (2007) Interrelationships between adaptation and mitigation. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of IPCC.

65 http://hal.cirad.fr/cirad-01213126/document.

Introduction and background
A review of scientific literature
Linkages under the UNFCCC and with other international agendas
Linkages in reports submitted by Parties and climate projects
Challenges, needs and opportunities
Conclusion

6 CONCLUSIONS

A mixture of synergies and trade-offs between adaptation and mitigation exist in several sectors. These vary in magnitude from sector to sector and between and within regions and nations, depending on, inter alia, local circumstances and implementation practices. Climate change adaptation and mitigation options can exhibit both positive and negative consequences for sustainable development in the scientific literature and submissions from Parties.

In addition to inter-relationships with sustainable development, adaptation and mitigation actions are linked to biodiversity, desertification, and food and agriculture under other international agenda, and there is great potential to implement mutually beneficial activities that take advantage of synergies between the legal instruments under the UNFCCC and those under CBD, UNCCD, and FAO in particular. A synergetic movement can enable system innovation and societal transformation for ambitious adaptation and mitigation.

Ecosystems, agriculture, energy and infrastructure are the key sectors where adaptation actions can have positive effects on mitigation. Similarly, energy, forests, agriculture, and urban planning tend to offer significant mitigation co-benefits for adaptation. In all the sectors mentioned, trade-offs exist but can be minimized if decision making and governance are enhanced by involving all stakeholders, including local communities, and if adaptation and mitigation projects are properly designed and implemented.

In Parties' reports and projects, synergies are being sought at project, sector or landscape level, in planning or institutional frameworks at national, regional or local level and in urban and rural settings. In addition to the synergies between adaptation and mitigation in key sectors, Parties reported that current efforts on disaster risk reduction can offer co-benefits for adaptation, and also highlighted the socio-economic benefits of mitigation projects, such as the creation of green jobs. It was not always clear whether the co-benefits or trade-offs were homogenous on temporal or spatial scales. For example, whether short-term co-benefits would change in the long term, or if local co-benefits from a climate policy had resulted in similar effects on a broader scale.

The Convention, the Kyoto Protocol, and the Paris Agreement emphasize the strengthening of the global response to the threat of climate change to achieve sustainable development and efforts to eradicate poverty. However, in reality, not all actions have resulted in the desired outcomes. This warrants an urgent need for developing effective means for monitoring and evaluation to make sure that adaptation and mitigation actions do not adversely affect people and the environment, and to improve current policy instruments and mechanisms accordingly.

A range of challenges and needs were identified with regard to the integration of adaptation and mitigation actions, and into sustainable development. Focusing too much on mitigation projects providing adaptation co-benefits and vice versa would not necessarily lead to an optimal mix of adaptation and mitigation interventions. Furthermore, the process of the integration of adaptation and mitigation projects can be complex and can bring difficulties in coordinating such projects.

It also adds a burden for beneficiary countries and project developers with low technical expertise and awareness if applying and reporting to multiple climate funds. Future research is required to enhance our understanding of challenges and of innovative solutions.

In order to provide an in-depth understanding of co-benefits, including benefits that cannot be monetized, as well as to enable the design of indicators for monitoring and evaluation on a temporal and spatial scale, a framework needs to be developed to integrate linkages between adaptation and mitigation action. This framework must take into account both positive and negative impacts associated with adaptation and mitigation actions, and consider how they effect one another. Additionally, the framework needs to enable the considerations of synergies with sustainable development and legal instruments under other UN processes.

WEB
unfccc.int

TWITTER
@UNFCCC (English)
@CMNUCC (Spanish)
@CCNUCC (French)
@UNKlima (German)
@PEspinosaC (UNFCCC Executive Secretary)

FACEBOOK
www.facebook.com/UNclimatechange

LINKEDIN
www.linkedin.com/company/unfccc

EMAIL
secretariat@unfccc.int

MAIN OFFICE
UNFCCC secretariat
UN Campus
Platz der Vereinten Nationen 1
53113 Bonn
Germany

HAUS CARSTANJEN OFFICE
UNFCCC secretariat
Martin-Luther-King-Strasse 8
53175 Bonn
Germany

United Nations
Climate Change