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Organization of the
United Nations

Agriculture and climate change

Law and governance in support
of climate smart agriculture and
international climate change goals

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Contents

<i>Foreword</i>	<i>ix</i>
<i>Acknowledgements</i>	<i>xi</i>
<i>Acronyms and abbreviations</i>	<i>xiii</i>
Introduction	1
Chapter 1. The international legal framework for climate change and agriculture	11
Chapter 2. Key features of international climate change law	19
2.1. Obligations in the Paris Agreement	22
2.1.1. Nationally determined contributions and other procedural obligations	22
2.1.2. Mitigation	23
2.1.3. Adaptation	29
2.1.4. Finance	31
2.1.5. Technology and capacity building	32
2.1.6. The 'Enhanced Transparency Framework'	33
2.2. Relevant principles inherent in the Paris Agreement and in climate law	36
2.2.1. Sustainable development	37
2.2.2. Highest possible ambition and progression	38
2.2.3. Best available science	39
2.2.4. Equity	41
2.3. Concluding remarks: climate change and agriculture moving forward	50
Chapter 3. The role of legal frameworks to achieve climate change goals	53
3.1. Implementing climate change goals at national level	55
3.1.1. Methods and legal tools	56

3.1.2.	Types of legal tools	56
3.1.3.	Assessment tools	57
3.1.4.	Harmonization and coordination of laws	58
3.2.	Framework climate change legislation	59
3.2.1.	Different institutional mechanisms established under climate change framework laws	60
3.2.2.	Framework laws containing mitigation measures	63
3.2.3.	Instruments used in framework laws	64
3.3.	Sectoral legislation	70
3.3.1.	Food Security	71
3.3.2.	Poverty eradication	73
3.3.3.	Human rights	74
3.3.4.	Procedural rights	76
3.4.	Concluding remarks for Chapter 3	82
Chapter 4. Legislating for climate change in the agriculture sector		85
4.1.	The international legal framework related to agriculture and climate change	86
4.1.1.	The international trade legal regime	86
4.1.2.	The Convention on Biological Diversity	89
4.1.3.	The United Nations Convention to Combat Desertification	91
4.1.4.	The International Treaty on Plant Genetic Resources for Food and Agriculture and the International Convention for the Protection of New Varieties of Plants	93
4.1.5.	Conventions on chemical management	94
4.1.6.	Non legally-binding international instruments	95
4.2.	Creating an enabling legal and institutional framework for integrating climate change goals in the agriculture sector	101
4.2.1.	Climate Smart Agriculture	104
4.2.2.	Legislating for Climate Smart Agriculture	106
4.2.3.	The institutional framework for agriculture and climate change	108

4.2.4.	Sustainable land management and security of tenure rights	114
4.2.5.	Financing and incentives	127
4.2.6.	Disaster risk management and response in agriculture	144
	<i>Early warning systems</i>	145
4.2.7.	Support for scientific research on climate change and agriculture	148
4.3.	Legislation on specific areas related to agriculture and climate change	149
4.3.1.	Soil management and climate change	149
4.3.2.	Crop production and climate change	155
4.3.3.	Legislation on livestock and climate change	180
4.4.	Concluding remarks	184
	Chapter 5. Legislating for climate change in the forestry sector	187
5.1.	Introduction	187
5.2.	International legal frameworks governing forests and forestry	193
5.3.	An enabling legal framework for sustainable forest management	199
5.3.1.	Institutional frameworks	204
5.3.2.	A land-use plan	209
5.3.3.	Forest tenure	211
5.3.4.	Economic incentives and financing for sustainable forest management	213
5.3.5.	Disaster risk management and reduction in forestry	216
5.4.	Integrating climate objectives into forest-related legislation	218
5.4.1.	Forestry aspects of a climate change policy	218
5.4.2.	Integrating climate goals into forestry sector legislation	219
5.4.3.	Climate change mitigation and the forestry sector	220
5.5.	Concluding remarks	239
	Chapter 6. Legislating for climate change in the fisheries and aquaculture sector	241
6.1.	Introduction	241

6.2.	International law relevant to climate change and fisheries and international fisheries law	248
6.3.	Addressing climate change in national fisheries and aquaculture legislation	258
6.3.1.	Institutional frameworks and mandates	259
6.3.2.	Integrating key principles for climate change in fisheries and aquaculture legislation	263
6.3.3.	Integrated coastal planning and fisheries tenure rights	269
6.3.4.	Disaster risk management and reduction in fisheries	274
6.4.	Legislation addressing adaptation to climate change for fisheries	276
6.4.1.	Legislation promoting an ‘Ecosystem Approach to Fisheries’ management	278
6.4.2.	Adaptive management	281
6.4.3.	Co-management/community-based management	283
6.5.	Legislation addressing mitigation in fisheries	286
6.5.1.	Measures to promote energy efficiency	287
6.5.2.	Energy incentives/subsidies in fisheries	287
6.5.3.	Control mechanisms on fishing gear and vessels	288
6.5.4.	Legislation for marine protected areas	289
6.6.	Aquaculture legislation and climate change	292
6.6.1.	General considerations	292
6.6.2.	Aquaculture authorities	296
6.6.3.	Legislation for adaptation in aquaculture	297
6.6.4.	Legislation for climate change mitigation and aquaculture	301
6.7.	Concluding remarks	301
	<i>References</i>	<i>303</i>

Boxes

Box 1.1	Agriculture mitigation and adaptation in the nationally determined contributions of Parties to the Paris Agreement	5
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Box 2.1	State of the Netherlands v Urgenda Foundation	47
Box 2.2	Ashgar Leghari v Federation of Pakistan	47
Box 2.3	Summary of main obligations arising from the Paris Agreement	48
Box 2.4	Differentiation of obligations between developed and developing country Parties to the Paris Agreement	49
Box 3.1	Examples of Assessment Tools	57
Box 4.1	Enhancing coordination for national level implementation	92
Box 4.2	Ecosystem or landscape approach	117
Box 4.3	The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT) on tenure related aspects of climate change action at national level	124
Box 4.4	A regional perspective on integrating climate and agriculture policies: measures within the European Union Common Agriculture Policy (CAP) and Emissions Trading System (ETS) policies	141
Box 4.5	Integrated Pest Management: an important approach for Climate Smart Agriculture	172
Box 5.1	The value of mangroves and peatlands	188
Box 5.2	Mitigation in nationally determined contributions	190
Box 5.3	Adaptation in nationally determined contributions	191
Box 5.4	The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries	222
Box 5.5	European Union Forest Law Enforcement, Governance and Trade – Voluntary Partnership Agreements	229
Box 6.1	Adaptation in the fisheries sector	245
Box 6.2	Mitigation in the fisheries sector	246
Box 6.3	Fisheries in nationally determined contributions	247
Box 6.4	Rights-based fisheries management	273

Figures

Figure 1.1	Distribution of climate laws worldwide by sector	18
Figure 2.1	The NDC Process	23
Figure 3.1	From international commitments and mechanisms to national policies and institutions	55
Figure 4.1.	The effects of climate change on agriculture	85
Figure 4.2	Elements for Climate Smart Agriculture legislation	107
Figure 6.1	Key principles to integrate into legislation on fisheries and aquaculture	264

Foreword

More often than not, national legal frameworks still do not include laws and measures specifically intended to tackle climate change in the agriculture sectors, be it in terms of mitigation, or of adaptation. However, national laws and institutional frameworks are necessary for good governance and can operate to support the implementation of national policy and international commitments.

Climate change policy and objectives are no different. Indeed, Target 16.3 of the Sustainable Development Goals (SDGs) calls for the promotion of the rule of law, and the assurance of equal access to justice for all. This is both an important stand-alone goal and an enabling goal for the realization of the transformative 2030 Agenda for Sustainable Development, adopted at the United Nations General Assembly in 2015. Furthermore, the Food and Agriculture Organization of the United Nations (FAO) sees appropriately designed, informed and responsive national legal and institutional frameworks as key to supporting the implementation of countries' commitments under the 2015 Paris Agreement (PA), as well as their Nationally Determined Contribution (NDC) in the food, agriculture and natural resources sectors.

Climate change presents multiple challenges and it cannot be addressed effectively in silos. Nor can it be addressed effectively by laws which are not backed by technical knowledge based on best available science and related capacities. Attention must be paid not only to specific agriculture sectors, but also to governance areas that are interconnected with agriculture, such as public spending and investment, social protection and rural development. Thus, a Ministry of Agriculture cannot address climate change without the collaboration of national agencies responsible for the environment, fisheries, forestry, land use, economy, or development, for example. Along the same lines, in order to succeed, efforts cannot be limited to those in the public sector and must engage civil society, including the legal profession, vulnerable groups and the

private sector. Therefore, this Study addresses the principal expressions of the food and agriculture sector by looking in turn at crop and livestock agriculture, forestry and fisheries, and for each of these, introduces critical cross-cutting issues and addresses their integration into agriculture law. By bringing together research, experience, and knowledge on the legal and regulatory implications of climate change in the areas of food, agriculture and natural resources, it crystallizes the vast body of science and knowledge around agriculture and climate change.

In support of the corporate FAO Strategy on Climate Change (2017), and responding to the priorities of FAO Members, the FAO Development Law Service developed a Law and Climate Change Strategy, specifically aimed at incorporating legal and institutional frameworks into FAO's ongoing efforts to address climate change impacts and mitigation in agriculture, in its project work at country level. The Law Strategy foresees national and/or regional training and capacity development activities in three main areas of legislative development related to Climate Smart Agriculture (CSA): i) sustainable land use and management, including governance of tenure; ii) sustainable forest management; and iii) sustainable livestock production.

This Study aims to provide law-and policy-makers, researchers, as well as private and public sector partners, with a comprehensive overview of the legal and institutional issues to consider when working towards preparing their agriculture sectors for the challenges of climate change. It is hoped that the Study will also provide a valuable resource for FAO technical departments, FAO partners, and beneficiaries of projects implemented by FAO.

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Acronyms and abbreviations

AFOLU	Agriculture, forestry, and other land use
APEC	Asia-Pacific Economic Cooperation (forum)
AoA	Agreement on Agriculture
BAS	Best available science
BMU	Beach management unit
BRT	Biennial Transparency Report
CA	Conservation agriculture
CAP	Common Agriculture Policy (European Union)
CAR	Rural Environmental Registry (Brazil)
CBD	Convention on Biological Diversity
CBDR	Common but differentiated responsibilities
CBDR-RC	Common but differentiated responsibilities and respective capabilities
CBF	Community-based forestry
CBFM	Community-based forest management
CBIT	Capacity Building Initiative for Transparency
CCAM	Climate change adaptation and mitigation
CCRF	Code of Conduct for Responsible Fisheries
CEDAW	Convention on the Elimination of all Forms of Discrimination Against Women
CERTI	Centre for Environmental Research, Training and Information
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement

CGIAR	Consultative Group for International Agricultural Research
CGRFA	Commission on Genetic Resources for Food and Agriculture
CIM	Inter-ministerial Committee on Climate Change (Brazil)
CIMGC	Inter-ministerial Commission on Climate Change(Brazil)
CISDL	Centre for International Sustainable Development Law
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
CO ₂ eq	CO ₂ equivalent
COP	Conference of the Parties
CSA	Climate Smart Agriculture
CSI	Climate Smart Irrigation
DNA	Deoxyribonucleic acid
DRM	Disaster risk management
DRR	Disaster risk reduction
EAA	Ecosystem Approach to Aquaculture
EAF	Ecosystem Approach to Fisheries
ECE	Economic Commission for Europe
ECHR	European Convention on Human Rights
ECOSOC	United Nations Economic and Social Council
EEZ	Exclusive economic zone
EIA	Environmental Impact Assessment
EIGE	European Institute for Gender Equality
ELI	Environmental Law Institute

ETF	Enhanced Transparency Framework
ETS	Emissions trading system
EU ETS	European Union Emissions Trading System
EWS	Early warning system
FAO	Food and Agriculture Organization of the United Nations
FLEGT	Forest Law Enforcement, Governance and Trade (European Union)
FMP	Fisheries Management Plan
FSN	Food security and nutrition
GACSA	Global Alliance for Climate Smart Agriculture
GATT	General Agreement on Tariffs and Trade
GCF	Green Climate Fund
GEF	Global Environment Facility
GFCM	General Fisheries Commission for the Mediterranean
GHG	Greenhouse gas
GMO	Genetically modified organisms
GSP	Global Soil Partnership
ICM	Integrated coastal management
ICCPR	International Covenant on Civil and Political Rights
ICESCR	International Covenant on Economic, Social and Cultural Rights
ICHRP	International Council on Human Rights Policy
ICTSD	International Centre for Trade and Sustainable Development
ICZM	Integrated coastal zone management
IDLO	International Development Law Organization
IFOAM	International Federation for Organic Agriculture Movements

ILA	International Law Association
ILO	International Labour Organization
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IPR	Intellectual property rights
ISO	International Organization for Standardization
ITMO	Internationally transferred mitigation outcome
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
ITQ	Individual transferable quota
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
IUU	Illegal, unreported and unregulated (fishing)
KJWA	Koronivia Joint Work on Agriculture
LCIPP	Local Communities and Indigenous Peoples Platform
LDC	Least developed country
LULUCF	Land use, land-use change, and forestry
LUP	Land-use plan
MCS	Monitoring, control and surveillance
MPA	Marine protected area
MRV	Measuring, reporting and verification
MWE	Ministry of Water and Environment (Uganda)
NAMA	Nationally Appropriate Mitigation Action
NAP	National Action Programme
NAPA	National Adaptation Programmes of Action
NBSAP	National Biodiversity Strategy and Action Plan

NCCP	National Climate Change Policy (Uganda)
NDC	Nationally determined contribution
OAS	Organisation of American States
OIE	World Organisation for Animal Health
PA	Paris Agreement
Parlatino	Parliament of Latin America and the Caribbean
PCCB	Paris Committee on Capacity-building
PES	Payment for ecosystem services
R&D	Research and development
REDD+	Reducing Emissions from Deforestation and Forests Degradation
SAFERS	Société d'Aménagement Foncier et d'Établissement Rural
SBI	Subsidiary Body on Implementation
SBSTA	Subsidiary Body on Scientific and Technical Advice
SCM	Subsidies and Countervailing Measures (Agreement)
SDG	Sustainable Development Goal
SDM	Sustainable Development Mechanism
SFM	Sustainable forest management
SIDS	Small island developing state
SLM	Sustainable land management
SOC	Soil organic carbon
SPS	Sanitary and Phytosanitary
SSF	Small-scale fishing
SSM	Sustainable soil management
TAC	Total allowable catch
TBT	Technical Barriers to Trade (Agreement)

TFAP	Tropical Forestry Action Plan
TURF	Territorial use rights for fisheries
UN	United Nations
UNCCCS	Uganda National Climate Change Communication Strategy
UNCCD	United Nations Convention to Combat Desertification
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UNFI	United Nations Forest Instrument
UNHRC	United Nations Human Rights Council
USAID	United States Agency for International Development
VGGT	Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security
VGSSM	Voluntary Guidelines for Sustainable Soil Management
VPA	Voluntary Partnership Agreement
WCDRR	World Conference on Disaster Risk Reduction
WHO	World Health Organization
WSC	World Soil Charter
WTO	World Trade Organization

Introduction

Climate change is one of the most pressing issues of our time. It has been widely acknowledged that the food and agriculture sectors are among the highest contributors to climate change and are also likely to suffer some of its worst consequences. The latest data from the Food and Agriculture Organization of the United Nations (FAO) reports that the share of greenhouse gas (GHG) emissions from aggregate agriculture-related activities along the supply chain, and including agriculture-related land use, was 19.8 percent of total GHG emissions in 2017 (FAOSTAT, 2020). The relevance of the agriculture sector in climate change discourse is also evidenced by the fact that most Parties to the Paris Agreement have included mitigation and adaptation actions in the agriculture sectors within their nationally determined contributions (NDCs) that were submitted to the *United Nations Framework Convention on Climate Change* (UNFCCC) (see Box 1.1).

Climate change is expected to have a detrimental impact on food security and agriculture in the medium to long term, ranging from reduced crop productivity and the pressures of population growth on the demand for food, to increased income inequality, human displacement, and threats to food security and nutrition. Key among these impacts are increasing climate variability and enhanced exposure to extreme weather events. The impact of climate change on agricultural productivity will be particularly severe as a result of changing rainfall patterns, drought, flooding, and the geographical redistribution of pests and diseases. In addition, the vast amounts of CO₂ absorbed by the oceans causes acidification, influencing the health of our oceans and those whose livelihoods and nutrition depend on them (FAO, 2018a).

At the same time, there is strong potential for these sectors to make a significant contribution towards reducing some of the causes of climate change and limiting its impact through the adoption of Climate Smart Agriculture (CSA) practices, supported by appropriate legal and institutional frameworks, among others.

As a whole, the agriculture sector (crops, livestock, forestry and fisheries, including aquaculture) and specifically its relationship to climate change, has received relatively little attention within the international legal and policy framework on climate change, despite its criticality for food security, preserving ecosystems or its contributions to climate change. While a number of instruments refer to the need for sustainable agriculture, they contain scant detail on the measures to be taken, and when and how they should be given effect. Nevertheless, the importance of food and agriculture has been highlighted in a number of international instruments, notably the *2030 Agenda on Sustainable Development* through the Sustainable Development Goals (SDGs) and the *Paris Agreement (PA)*, adopted in 2015, which recognizes the critical role of agriculture, emphasising the “fundamental priority of safeguarding food security and ending hunger, and the particular vulnerabilities of food production systems to the adverse impacts of climate change” (Preamble to the PA). Agriculture is now explicitly recognized and given prominence in the *Koronivia Joint Work on Agriculture (KJWA)*, adopted by the Conference of the Parties (COP) at its twenty-third session (COP 23) in November 2017. This represents a landmark decision which now provides a dedicated platform at the international level to address the impacts of agriculture (with a focus on crops and livestock) on climate change and, vice versa, the effects of climate change on agriculture, food security and nutrition, and sustainable development. Other international instruments that will be reviewed in this Study, such as the *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT)* endorsed in 2012 and the *Voluntary Guidelines for Sustainable Soil Management (VGSSM)* endorsed in 2016), also directly or indirectly promote mitigation and adaptation in the agriculture sector.

The development of enabling legal and institutional frameworks is a vital part of ensuring that international commitments in the field of sustainable agriculture and natural resource management are implemented and made sustainable through the establishment of appropriate rights and binding obligations, using a participatory and transparent process. Indeed, law is playing an increasingly important role in addressing climate change, both at the national and international levels. Law is an

important vehicle for promoting good governance, protecting rights and facilitating the meaningful participation of a range of stakeholders, including vulnerable communities and women. Effective governance also requires that laws be well-publicized, enforced and implemented, and that they include provisions on accountability, oversight and redress.

Addressing climate change in agriculture is no different. Law is the lynchpin for creating binding climate related commitments, giving effect to national climate policies such as the NDCs, establishing institutional arrangements and channelling climate finance.

Many countries have committed to the development of overall climate change strategies and national adaptation plans (NAPs) as part of their NDCs required under the PA. As of April 2020, all 195 parties to the PA have at least one law or policy related to climate change and, since 2016, over 100 new climate change laws or policies have been adopted worldwide, bringing the total to around 1 500 laws and policies globally. Around one quarter of these laws and policies are directly concerned with climate change mitigation and adaptation. Other laws and policies are part of a body of sector-specific legislation. However, there generally remains a disconnect between specific international commitments to address climate change and the development of national legislation. Of the plethora of climate change related laws, only 28 of these refer directly to the PA. Moreover, there is concern that the development of new climate change laws has slowed and is not keeping pace with the increasing requirements for monitoring and reporting progress on reducing GHGs, which may ultimately lead to a failure to reach climate targets. However, as already mentioned most Parties to the PA included mitigation and adaptation actions in the agriculture sectors within their NDCs.

It is the underlying thesis of this Study that developing new or refining existing laws related to the agriculture sector is an essential part of national efforts to meet obligations and commitments made under the PA. Addressing climate change is crucial in order to protect agriculture from harmful consequences and to promote its sustainability, thereby promoting food security and nutrition, and safeguarding the livelihoods of millions of people worldwide.

One of the most significant areas in need of further legislative development and support is CSA. CSA is a policy concept used to refer to agricultural practices and policies which simultaneously achieve higher productivity, environmental sustainability, mitigation or elimination of GHG emissions, and improved resilience or adaptation to changes in climate. The many inter-linking aspects of CSA make it challenging to realize, as there are often competing interests at stake, requiring trade-offs or progressive implementation. However, when utilized effectively, CSA has the potential to benefit all sectors of society, from small landholders and primary producers, to governments, the corporate sector and wider society, thereby contributing towards poverty alleviation, food security, nutrition, economic development, sustainable land use, biodiversity, and climate adaptation and mitigation. The scope and effectiveness of existing national legislation supporting CSA is diverse. Rather than a single law or coherent system of interconnecting laws from national to local level, many countries have highly dispersed and disconnected legislation governing a range of topics and levels of governmental responsibility. Such topics range across crop and livestock production, plant and animal health, agriculture processing and industry, forestry and fisheries, farming rights, land tenure, agricultural infrastructure, finance, credit and economic incentives, research, intellectual property, and trade, among many others. There are a number of areas in which well-thought-out legislation could make an important contribution to CSA, including mainstreaming CSA into core government policies and programmes. Integrating these various components effectively into national legislation, while challenging, would be an important step towards achieving climate change goals. A concerted effort is required to improve the global knowledge base in these areas, to learn from existing best practices and develop tools and resources to support governments in developing appropriate legal frameworks.

Agriculture and land-use management feature prominently in many NDCs but often lack the backing of legislation. While it is encouraging that some 89 percent of all countries include commitments in the area of agriculture or land use as part of their NDCs, the number of climate change related laws in the agricultural sector is very low. This is particularly

so if compared to other sectors, such as energy, which accounts for around 39 percent of all laws and policies on climate change. In fact, it is estimated that there are “more than twice as many energy-related acts as agriculture-related acts, even though the two make up similar amounts of global greenhouse gas emissions” (Grantham Research Institute, 2016). This Study aims to assist countries in their contribution to filling this gap.

Box 1.1

Agriculture mitigation and adaptation in the nationally determined contributions of Parties to the Paris Agreement

Mitigation:

- 148 countries include agriculture (crops, livestock) in their mitigation contributions; collectively accounting for 92 percent of global agricultural greenhouse gas emissions.
- 86 percent (128) of these 148 countries include agriculture within their overall greenhouse gas emissions target, several of whom only implicitly.
- While the majority of countries (54 percent) do not further elaborate on concrete actions in agriculture for achieving their greenhouse gas emission targets, some countries include sectoral targets (Page 13):
 - Uruguay sets a sectoral target for reducing greenhouse gas emissions from livestock production; Burundi targets a gradual 100 percent replacement of mineral fertilizers with organic fertilizers by 2030;
 - Several countries include specific policies and measures to achieve their mitigation contributions, focusing in particular, on
 - cropland management
 - livestock management
 - grazing land management
 - forest management and restoration, afforestation/ reforestation and reducing deforestation.

Box 1.1 (cont.)

- 40 percent of countries (59 countries out of 148) outline mitigation policies and measures either under a target and/or action; the level of detail varies, ranging from countries that only note the sector or respective inventory subcategories (e.g. managed soil, enteric fermentation), to comprehensive descriptions of implemented, planned or intended policies and programmes/projects in this sector.
- Among the specific policies and measures mentioned:
 - 43 percent of countries refer to land-based agriculture (cropland and grazing land management). Under cropland management, countries mentioned “nutrient management” (23 countries); “tillage/residues management” (19 countries) and “rice management” (17 countries); while specific contributions also highlight “plant management” (12 countries) and “water management” (9 countries); some countries specify grazing land management (18 countries).
 - Of the 69 countries that mention livestock, 19 countries highlight concrete measures referring to “feed management” (10 countries); “breeding management” (5 countries); “manure management” (15 countries).
 - 30 countries mentioned activities related to integrated systems such as “agroforestry”; 16 countries refer to “climate-smart agriculture” (Page 14).

Adaptation:

- Among the 131 countries that include priority areas for adaptation and/or adaptation actions related to the agriculture sectors, nearly all of them (97 percent) refer to agriculture.
- 114 countries outline specific policies and/or measures for agriculture. Furthermore, 100 countries include specific adaptation actions regarding crop systems, with more than 25 percent drawing a clear reference to food security.
- Most of those 100 countries refer to agriculture methods directed at water, plant and soil management. When addressing observed or predicted water scarcity and potential impacts on crop production, countries refer to adaptation actions related to improving irrigation and the use of heat- and drought-tolerant crops.

Box 1.1 (cont.)

- Enhancing the variety of crops (including research on plant genetic resources), pest management and soil conservation practices are referred to by many countries when outlining their adaptation actions. A total of 34 countries refer to the use of plant genetic resources. Most of these countries mention stress-tolerant crops (to drought, flood, salt, pest and diseases) as well as short-cycle crops. Measures refer not only to the sustainable use of varieties, but also to the development, conservation and creation of germplasm banks.
- The importance of preserving traditional breeding knowledge, research and development (R&D) in crop varieties, and the adoption of climate resilient crops from other regions are often mentioned. A few countries state quantified measures, as for example, Burkina Faso specifies the amount of land on which organic fertilizer will be applied. The Niger sets specific targets for the amount of land on which multi-use species will be cultivated.
- 71 countries mention livestock and pastoral systems, of which 66 countries mention specific actions, ranging from rehabilitation of degraded rangeland to improved management of transhumance and agro-pastoralism, and fire control. Livestock management is addressed with respect to animal health (e.g. pests and disease monitoring), breeding (e.g. biological diversity of livestock and improved species), and feed management (e.g. supplements and improved fodder crops).
- In order to strengthen livelihoods of those directly and indirectly dependent on crop and livestock production, several countries refer to the importance of suitable insurance schemes, early warning systems, and the necessity to include the post-harvest sector in adaptation strategies.
- It is to be noted that many of the NDCs set out both adaptation and mitigation co-benefits for agriculture. This is important to avoid deleterious action that, cumulatively, could have a negative impact. One example of this approach is found in the NDC submitted by Rwanda in 2015, which highlights adaptation and mitigation benefits of proposed measures, including in agriculture.

Source: FAO, 2016a.

This Study responds to the call of the *FAO Climate Change Strategy* of 2017 to develop guidance to support states' efforts to implement their climate change obligations. In particular, it aims to assist countries to implement their commitments under international law and in their NDCs. The legal issues arising from the interlinkages between climate change and agriculture (including crops and livestock agriculture, fisheries and forestry), as well as the importance of sustainable land-use management overall, are explored in detail. This Study also explores the background of the legal issues and provides examples and recommendations relating to the formulation and implementation of climate-related legislation. A common thread throughout its analysis is that the development of legislation should be participatory, inclusive and multidisciplinary, which reflects the established approach of the FAO Development Law Service.

This Study is divided into six chapters, in addition to this Introduction. Chapter 1 sets the background scene by looking at the main elements of the international legal framework on climate change and agriculture. Chapter 2 explores the main legal obligations arising from the PA and how these impact upon the implementation of the NDCs, as well as relevant general principles of law applicable to climate change. Chapter 3 looks at the role of legislation in achieving climate change goals deriving from general and specific obligations under international law. In particular, the option of framework climate change legislation is explored – a growing trend in legal frameworks for climate change action at the national level – including what is typically covered in that type of legislation, as well as cross-cutting issues relevant to its implementation.

Chapters 4 to 6 address specific sectors, analysing international instruments – both binding and voluntary, including FAO instruments – related to each sector. Examples of domestic legislative measures that can be supportive of achieving climate change goals in the sector are provided. The categorization of agriculture and its sub-sectors follows the overall FAO approach to its work. Accordingly, Chapter 4 addresses agriculture (crops, livestock and land use), Chapter 5 addresses forestry, and Chapter 6 addresses fisheries and aquaculture. Each chapter contains some main findings and conclusions that have been informed

by analysis of important cross-cutting issues, such as security of tenure, human rights, gender equality, and food security and nutrition.

This Study was developed primarily through a review of key international instruments, both binding (such as the PA) and non-binding, or soft-law instruments (such as the VGGT). A review of relevant literature was undertaken to provide authoritative contexts and to identify priority areas/issues where the nexus between climate change and agriculture is apparent and thus where, and in what manner, legislative intervention could be used to achieve climate change goals. Based on these analyses, the Study presents examples of national laws, or provisions thereof, from different regions and legal traditions that address specific or more general issues relevant to the nexus between climate change and agriculture. It is acknowledged, nevertheless, that relatively few examples of such legislative measures currently exist.

FAO wishes to underline that the information contained in this Study with respect to national legislation is based on a review of enacted law as it stood at the time of finalization of the Study. An analysis of implementation outcomes and good practices of national laws are beyond the scope of this Study, as these can be context specific.

It is hoped that law and policymakers globally will use the guidance presented in this Study to develop and implement climate-sensitive agriculture legislation and to build enabling legal frameworks in that regard.

Chapter 1. The international legal framework for climate change and agriculture

Climate change has been recognized as a common concern of humankind, and more specifically, as an urgent and potentially irreversible threat to human societies and the planet, so much so as to be referred to by António Guterres, the Secretary-General of the United Nations (UN), as an “emergency” (COP25, 2019). Guterres has also stated that “climate change is the defining issue of our time – and we are at a defining moment. We face a direct existential threat” (United Nations, 2019a). Prior to this, the former UN Secretary-General, Ban Ki Moon, declared climate change as “the defining challenge of our age” (UN Climate Summit, 2014). Plural authoritative scientific sources confirm that human influence on the climate system is clear and that recent anthropogenic emissions of greenhouse gases (GHGs) are the highest in history, with widespread impacts on human and natural systems. The *Fifth Assessment Report (AR5)* of the Intergovernmental Panel on Climate Change (IPCC) addresses a vast number of these adverse impacts, such as rises in sea level, increased incidences of drought, heatwaves, average temperature fluctuations, and more intense severe weather events (IPCC, 2013). These impacts have significant consequences for agriculture and food security.

Furthermore, recent reports reveal that the world is not on track to meet the goals of the *Paris Agreement (PA)* and that emissions will continue to rise even beyond 2030 (UNEP, 2019). If we rely on the current climate commitments of the PA, temperatures can be expected to rise to 3.2 °C above pre-industrial levels this century. Consequences of this are not only felt in terms of increased temperatures and increased natural disasters, but also on agricultural production and food security and the consequent development levels of many countries who suffer vast economic losses as a result of natural disasters. While we are witnessing positive steps in terms of increased climate financial flows and the development of

NDCs under the PA, far more ambitious plans and accelerated actions are needed on mitigation and adaptation to climate change. Access to finance and capacities need to be scaled up at a much faster rate, particularly for least developed countries and small island developing states (UN, 2019b).

The UNFCCC is the principal international instrument addressing climate change. It sets out a framework for the global negotiation and adoption of further international treaties to progress on climate-related objectives. Adopted at the Rio Earth Summit in 1992, it counts 197 parties (196 States and 1 regional economic integration organization) as of April 2020. The Convention aims to “prevent dangerous anthropogenic interference with the climate system” (Article 2) and to enhance and strengthen the international policy framework and response to the threats posed by climate change. The COP to the UNFCCC adopted the PA in 2015, which builds upon the framework of the UNFCCC and charts a new course in global efforts to address climate change. As of April 2020, 195 Parties had signed the Paris Agreement and 189 Parties had ratified it (Depositary, United Nations Treaty Collection, Chapter XXVII 7.d). The PA’s central aim is to keep a global temperature rise during the twenty-first century well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 °C. Additionally, the PA aims to strengthen the ability of countries to deal with the impacts of climate change. To reach these ambitious goals, appropriate financial flows, a new technology framework and an enhanced capacity-building framework are provided for, thereby supporting developing countries and the most vulnerable nations, in line with their own national objectives. The PA also provides for an enhanced transparency framework for action and support.

Countries are required to use their best efforts towards mitigation and adaptation goals and to communicate these through their NDCs. All Parties are required to report regularly on their emissions and on their implementation efforts – as of October 2019, 184 Parties had communicated their first NDC and 1 Party had communicated their second NDC, and as of April 2018, 10 developing countries had successfully completed and submitted the first iteration of their national adaptation plans for responding to climate change (UN, 2019c). The

PA creates a significant number of new international legal obligations, in addition to those existing under current international law, as will be detailed in this Study.

In 2015, the global community also developed the *Sendai Framework for Disaster Risk Reduction 2015–2030*, which was endorsed by the UN General Assembly following the 2015 Third UN World Conference on Disaster Risk Reduction (WCDRR). The main priorities for action under this Framework were set as: 1) understanding disaster risk; 2) strengthening disaster risk governance to manage disaster risk; 3) investing in disaster risk reduction for resilience; and 4) enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction. The Framework invites collaboration across global and regional mechanisms and institutions for the implementation and coherence of instruments and tools relevant to disaster risk reduction (DRR), such as for climate change, biodiversity, sustainable development, poverty eradication, environment, agriculture, health, food and nutrition and others, as appropriate. The Framework invites countries to report on whether they have prepared a National Disaster Risk Reduction Strategy and whether DRR is an integral objective of their environment-related policies and plans. Amongst the agreed outcomes of the Framework is the need to

Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience (Section II, 17, p. 12).

Returning to the PA, while its Preamble recognizes “the fundamental priority of safeguarding food security and ending hunger, and the particular vulnerabilities of food production systems to the adverse impacts of climate change”, it was not until the adoption of the *Koronivia Joint Work on Agriculture (KJWA)* that an international plan to promote and support the implementation of climate goals in the agriculture sector was established (UNFCCC, 2017). The Koronivia decision has

not only created a platform for policy exchange and development on the climate/agriculture nexus, it has also put agriculture and all nature-based solutions at the heart of the international climate agenda.

In the KJWA, the impacts of agriculture (with a focus on crops and livestock) on climate change and the effects of climate change on agriculture, on food security and nutrition, and on sustainable development, were fully acknowledged and given space for dialogue at the international level. The KJWA contains a roadmap that has set targets until 2020 for activities at the global level to improve sustainable agriculture and to address the socio-economic and food security dimensions of climate change in the agriculture sector. Work in this area is led by two UNFCCC subsidiary bodies: the Subsidiary Body on Scientific and Technical Advice (SBSTA) and the Subsidiary Body on Implementation (SBI). As a result, the focus on agriculture under the UNFCCC process has been broadened from a purely scientific and technical one to include implementation issues.

The KJWA calls for a report on progress and outcomes to the UNFCCC COP26 of 2020. It provides a non-exhaustive list of topics in its working agenda, including: adaptation, adaptation co-benefits and resilience; soil carbon, soil health and soil fertility under grassland and cropland as well as integrated systems, including water management; nutrient use and manure management; livestock management systems; and socio-economic and food security dimensions of climate change in the agricultural sector. Consequently, enhanced climate action in the agricultural sectors is to be expected over the coming years.

The PA and the KJWA are also directly linked to the *2030 Agenda for Sustainable Development*, specifically Sustainable Development Goal 13 (SDG 13), which calls upon UN Member States to “take urgent action to combat climate change and its impacts”. SDG 13 recognizes the relationship between climate change and sustainable development and establishes climate targets, while confirming the UNFCCC as the primary intergovernmental forum to negotiate global climate action and support its implementation. One of the targets under SDG 13 is to “integrate climate change measures into national policies, strategies and planning” (UN, 2019c).

From an international law perspective, both the PA and the KJWA should be seen in the context of general public international law, which contains a set of binding norms, including those reflected in treaties that are also relevant to efforts to combat climate change, ensure greater food security, and to foster sustainable agricultural practices and natural resource management. For example, the customary law duty of states to cooperate with each other, and the due diligence duty to avoid transboundary harm, are clearly relevant in the context of addressing climate change, as are the environmental law principles of prevention, precaution, and sustainable development. Indeed, the PA itself operationalizes the international environmental principle of common but differentiated responsibilities and respective capabilities and the principle of non-regression, as will be explained in Chapter 2.

Furthermore, there is already recognition that climate change (and air pollution which is intrinsically linked to it) will interfere both directly and indirectly with the enjoyment of a wide range of fundamental human rights such as the right to life, health, food, and to an adequate standard of living (UNEP, 2015). It is also widely acknowledged that

the human rights consequences of natural disasters resulting from climate change are apparent in political and economic instability, growing inequality, declining food and water security and in increased threats to health and livelihoods (CEDAW, 2018).

As a result, we are seeing courts around the world make more explicit connections between climate-related health risks and human rights protection (Cook, 2019). Climate change will impact most critically upon the rights of children, women, minorities and indigenous peoples.

Thus, international law and human rights law already provide a substantive and compelling legal argument for state as well as for non-state actors such as civil society, social movements, business and subnational actors, to take action, both collectively and individually, and within their respective areas of influence and mandates, to respond to the climate change threat.

Indeed, given the prominence that climate change impacts have been acquiring over the years globally, explicit pronouncements exist on the international legal issues and principles that are considered to apply to this field, in addition to the existence of international, hard law obligations. For instance, the International Law Association's *Declaration of Legal Principles Relating to Climate Change* (Schwarte and Frank, 2014), as well as the *Oslo Principles on Global Climate Change Obligations* (Global Justice Program, 2015), identify the international law principles discussed earlier and reflect on, in particular, the inter-relationship between all human rights and their relation to climate change impacts. Although non-binding, these two instruments represent international consensus and are, thus, arguably also a basis for states' action.

Given the cross-cutting nature of climate change, promoting the transformative changes needed to face this challenge will require substantial, coordinated, and global efforts across all economic sectors, including the food and agriculture sectors. It will also require synergies and coherence across national policy frameworks and laws that only until recently have not explicitly considered climate change, for example, those of the energy and transport sectors. Indeed, the importance of appropriate legal frameworks addressing climate objectives has been acknowledged by some countries; according to research undertaken by the Center for International Sustainable Development Law in 2016, 156 NDCs refer to the need for improvements in legal and institutional infrastructure to achieve climate change mitigation and adaptation (CLGI and CISDL, 2016). More recent data is not available and this is ascribed to the fact that there is still a significant gap between the level of ambition in NDCs and the translating of the commitments made therein into quantified and measurable domestic targets, including legislation and policies (Nachmany and Mangan, 2018).

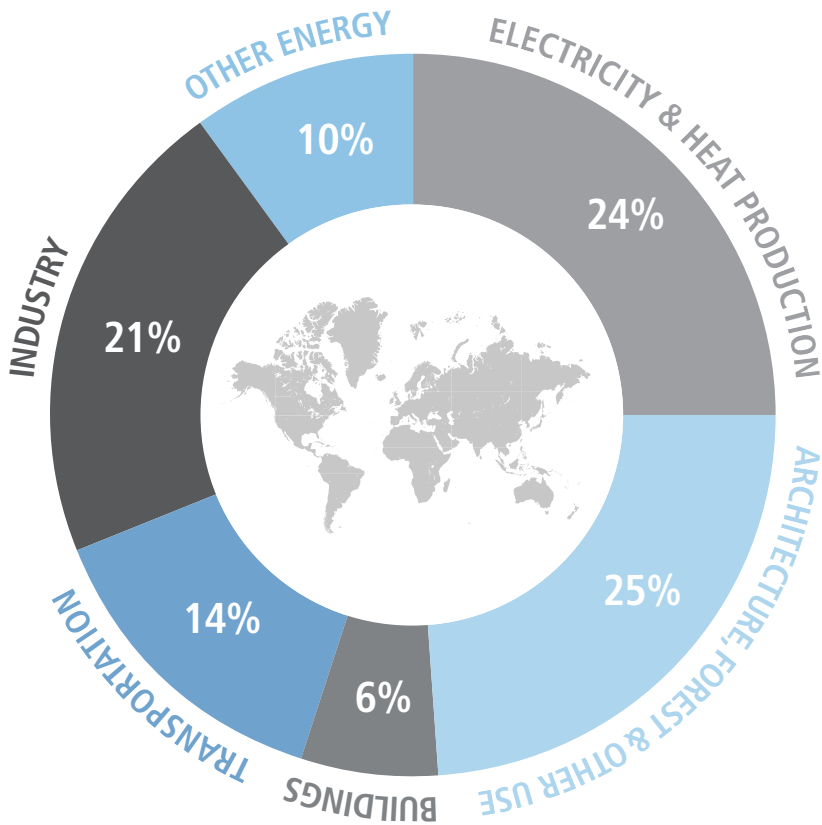
It is indeed the fundamental proposition of this Study that a state's ability to achieve its climate-related objectives as set out in its NDC, and to contribute to the achievement of the global objective to limit temperature rise, will in good part depend on its readiness and ability to enact appropriate legislation (Schwarte, 2017).

However, despite legal developments at the international level, the adoption of domestic legislation that addresses climate change in the food and agriculture sectors is lagging behind. A study by the Grantham Research Institute entitled *The Global Climate Legislation Study: Summary of Key Trends 2016*, noted an increase in national framework climate legislation and energy-related climate statutes. A 2017 update to that study indicated that

the most prominent focus for sectoral laws is energy” and that “on a much smaller scale, climate change is also incorporated into general environmental regulation, as well as into forestry, transport and agriculture legislation (Grantham Research Institute, 2017).

Furthermore, as different sectors are responsible for GHG emissions (transportation, manufacturing, retail, and the food and agricultural production and supply chain), laws that specifically target these sectors are more likely to effectively address the conditions, technologies, and behaviours that occur in each sector. Similarly, the management of substances other than carbon dioxide such as nitrous oxide, methane, fluorinated gases and black carbon, can only be regulated through specifically targeted laws. These considerations testify to the importance of enacting laws that integrate climate change considerations and goals into the entire spectrum of agriculture and its value chains (Dernbach, 2017).

Figure 1.1
Distribution of climate laws worldwide by sector



872 acts addressing energy supply

320 acts addressing emissions from agriculture, forestry and land use change

Source: Averchenkova, 2019; data from Climate Laws of the World database (Sept. 2018).

Chapter 2. Key features of international climate change law

This Chapter provides an analytical overview of the current international legal framework on climate change, focusing on the 2015 *Paris Agreement (PA)*. The goals of the Chapter are to highlight subject areas, issues and specific legal obligations arising from the PA and deriving from the implementation of NDCs; and to provide a commentary on key principles and cross-cutting themes that are part of this framework and that should be considered in the development of national climate change policies and law.

The issues discussed in this Chapter will be instrumental for the analysis of sectoral legislation in the chapters that follow. It should be noted that while featuring some specific legal obligations, the PA also created a framework for the development of further substantive decisions about its implementation by the Conference of the Parties (COP), serving as the Meeting of the Parties (CMA) to the PA. The related guidance, methodologies and regulations, the so-called ‘rulebook’ of the PA entitled the *Katowice Climate Package*, was adopted by the CMA in 2018.¹

Most existing international legal instruments on climate change were formulated under the umbrella of the UNFCCC. This includes the *Kyoto Protocol (KP)* of 1997 and the PA, as well as numerous decisions taken by the COP and subsidiary bodies to these treaties, notably the SBSTA and the SBI mentioned in Chapter 1. What is commonly referred to as the ‘international climate regime’ also encompasses principles and rules of general international law; norms inherent in other treaty regimes (not dealt with in this Study); regional, national and sub-national regulations; and judicial decisions (Bodansky, Brunnée and Rajamani, 2017). For the

¹ Further information on the Katowice Climate Package can be found at <https://unfccc.int/process-and-meetings/the-paris-agreement/paris-agreement-work-programme/katowice-climate-package>

purpose of this Study, the analysis will encompass the UNFCCC, the KP and the PA.

The UNFCCC is, as stated by its name, a framework convention. This means that while it established collective goals for parties to *achieve (...) stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system* (Article 4), its obligations are, for the most part, procedural ones which concern the submission of information and formulation of national-level measures contributing to this goal. The UNFCCC refrained from setting more concrete and mandatory obligations such as targets for GHG emission reduction. Rather, it established a system of negotiation through which amendments and new instruments resulting from such negotiations could be adopted. Since then, the international climate regime has been developing in an innovative way, within the overall context of international environmental law and international human rights law, combining both top-down and bottom-up approaches with regard to the legal obligations created (Bodansky, Brunnée and Rajamani, 2017).

The KP was adopted on 11 December 1997 and entered into force on 16 February 2005. It established mandatory obligations of results for the reduction of controlled GHG emissions, referring to a group of developed nations only (namely the UNFCCC 'Annex 1 countries'). This top-down approach became one of the most controversial aspects of the KP, for two main reasons. First, the major developing countries, whose historical emissions were at the time of the negotiations lower than those of developed countries, had no reduction targets. This created domestic difficulties in several developed countries. In addition, those Parties to the KP who had emission targets, accounted for only 24 percent of 2010 global emissions by the end of the first commitment period, which ran from 2008 to 2012. A second and major hurdle was the lack of ratification on the part of some of the most developed countries (Bodansky, Brunnée and Rajamani, 2017).

On 8 December 2012, after lengthy negotiations, the *Doha Amendment to the Kyoto Protocol* was adopted. Albeit covering a smaller fraction of

global GHG emissions (Bodansky, Brunnée and Rajamani, 2017), and while it included new commitments for developed Parties and a second commitment period running from 2013 to 2020, it has yet to enter into force, with only 138 ratifications of the required 144, as at June 2020.

In 2011, negotiations for a new legal instrument began in Durban (*Decision 1/CP.17*), which resulted in the adoption of the PA at COP21 in December 2015. The PA entered into force on 4 November 2016 (*Decision 1/CP.21*) and sets the new global framework for climate action. Taking into account the limitations of the KP model, the PA on the other hand is innovative in its adjustment of the design of the international climate regime.

First, it concretizes the objectives of the UNFCCC, which were focused on the “*stabilization of greenhouse gas concentrations [...]*”, to add a more specific overall temperature goal. The PA is also innovative in its inclusion of climate change adaptation as an equally important goal, and in the provision for finance flows “*towards low greenhouse gas emissions and climate resilient development*”, both aspects of which will be further examined later in this Study, along with the PA’s main legal obligations.

Second, similar to the UNFCCC, the PA expresses overall obligations of conduct for all Parties, who will together operate to achieve a collective goal to limit temperature rise, yet does not create specific emission reduction targets for individual Parties. In this regard, the PA changes the previous top-down approach of the KP, which established an overall target obligation of GHG emission reductions for individual developed Parties, to a bottom-up approach whereby Parties can decide their individual contributions to the overall mitigation target through their NDCs.

The PA also introduced an innovative implementation architecture entitled *Modalities, procedures and guidelines for the transparency framework for action and support (Decision 18/CMA.1)*, established by Article 13. This framework, the first of its kind to be found in global environmental governance, incorporates an approach through which GHG emission reduction targets are set at national level, while the guidance for measuring, reporting and verification of such targets (MRV) is developed at the international level (Viñuales, 2015).

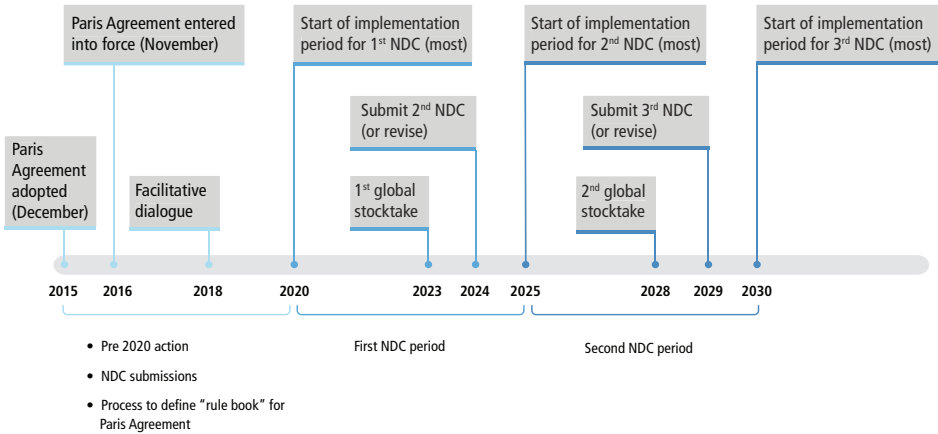
2.1. Obligations in the Paris Agreement

2.1.1. Nationally determined contributions and other procedural obligations

One of the main procedural obligations established under the PA is the preparation, communication and maintenance of NDCs (Article 4.2(1)). The NDCs, which are at the heart of the PA, are to be communicated every five years and recorded through a public registry (Article 4). This allows Parties to increase the level of ambition expressed in their NDCs with the objective of reaching the overall limit in temperature rise goal (Article 2; Article 4), considering their national contexts and priorities. Notwithstanding a significant amount of discretion afforded to Parties, the principles of 'highest possible ambition', 'progression' and 'best available science' should be applied when developing NDCs.

Moreover, Parties are required to contribute to the 'transparency framework', which includes obligations to communicate a national inventory report of anthropogenic GHG emissions and information on climate change impacts and adaptation, as well as information necessary to track their progress in implementing and achieving their NDCs. These reports undergo a technical expert review, which is intended to be facilitative and to identify capacity-building needs (Article 13). The collective progress in achieving the NDCs is to be measured against the PA's collective goals. To ensure that successive NDCs are progressive in their ambition and as such effectively enable progress towards the PA's long-term goals, Article 14 of the PA includes provision for the carrying out of a 'Global Stocktake' every five years. The first Global Stocktake is scheduled to take place in 2023 and has been preceded by a 'facilitative dialogue' officially named the *Talanoa Dialogue* in 2018, a similar process aimed at raising ambition prior to 2020. Under *Decision 1/CP.21* of 2015, all Parties are requested to submit the next round of NDCs (new NDCs or updated NDCs) by 2020 and every five years thereafter (e.g. by 2020, 2025, 2030), regardless of their respective implementation time frames.

Figure 2.1
The NDC Process



Source: FAO, 2018a.

By allowing more flexibility at the national level, the PA has attracted near universal ratification by UNFCCC Parties and resulted in its entering into force in November 2016, less than a year after it was adopted by the COP.

2.1.2. Mitigation

The PA outlines a collective goal to limit global temperature rise to well below 2 °C above pre-industrial levels and to pursue efforts to limit temperature increases to 1.5 °C (Article 2, Para. 1(a)). This temperature goal now renders specific the general goal of Article 2 of the UNFCCC of "achieving ... stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." The goal of the PA is, however, framed in a soft manner; Article 4 (Para. 1) specifies that

Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with

best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty.

At the same time, and in contrast with the KP that envisioned specific emission reduction targets for certain countries, the PA requires Parties to determine their own individual mitigation commitments, based on their highest possible ambition. This is accompanied by the need to pursue domestic mitigation measures to achieve their respective NDCs. As indicated previously, this represents a significant change from the KP's design, and signals a transition to a bottom-up approach on climate action in which Parties are given freedom to determine how to reach the overall mitigation goal. Within this overall architecture, Article 4 of the PA establishes several legal obligations, determining that each Party *shall*:

- Prepare, communicate and maintain NDCs that it intends to achieve, every 5 years:
 - In so doing, provide the information necessary for clarity, transparency and comprehension;
 - NDCs *shall* be communicated every five years and recorded in a public registry maintained by the UNFCCC Secretariat;
 - Successive NDCs *will* represent a progression and reflect each Party's highest possible ambition, reflecting its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances;
 - Developed country Parties *should* undertake economy-wide absolute emission reduction targets² while developing country Parties *should* continue to enhance their mitigation efforts and are *encouraged* to move towards economy-wide targets over time.

² This can be expressed in terms of reduction percentage against a base year (e.g. 40 percent by 2030 compared to 1990, or as carbon budget/allowance for a period of time (e.g. 1.95 billion tonnes of carbon dioxide equivalent for the 2023–2027 period (*The Carbon Budget Order 2011*, United Kingdom of Great Britain and Northern Ireland, 29th June 2011).

- Pursue domestic mitigation measures *with the aim* of achieving the objectives of such NDCs (Article 4, Para. 2);
- Account for anthropogenic emissions and removals corresponding to their NDC, promote environmental integrity, transparency, accuracy, completeness, comparability and consistency, and avoid double counting;
- Article 4 (Para. 19) also requires all Parties to *strive* to formulate and communicate long-term low GHG emission development strategies, according to their national capabilities;
- Least developed countries (LDCs) and small island developing states (SIDS) *may* prepare and communicate strategies, plans and actions for low GHG emissions that take account of their special circumstances.

Thus, it is clear that the PA contains concrete and tangible obligations in relation to the preparation and submission of NDCs, as well as mechanisms for accounting and reporting on those obligations. In contrast, concerning the actuality of achieving the objectives set out in an NDC, the PA only requires a Party to aim to achieve its NDC objectives through domestic mitigation measures.

In terms of the manner in which NDC goals could be achieved, Parties have been given discretion to use a number of possible policy approaches, such as the adoption of overarching cross-sector measures like carbon taxes or emission trading schemes, or measures that apply to specific sectors. In addition, Article 6 of the PA outlines cooperative mechanisms that Parties can use in order to achieve their mitigation goals, many of which build on existing international cooperative mechanisms, as follows:

- Internationally transferred mitigation outcomes (ITMOs) (Article 6, Para. 2). This mechanism allows projects that reduce emissions beyond business as usual in one country to earn quantified mitigation outcomes that can be traded globally and used by other Parties in support of achieving their NDCs; this also

includes the linking of domestic with regional emission trading schemes and facilitates cross-jurisdictional transfer of units. Such processes should enable the creation of a market-based approach that engages all stakeholders to increase their climate ambitions.

- A “Sustainable Development Mechanism” (Article 6, Para. 4) aimed at promoting GHG mitigation while fostering sustainable development, incentivizing and facilitating participation in mitigation efforts by public and private entities authorized by a Party, contributing to the reduction of emission levels in the host Party, which will benefit from mitigation activities resulting in emission reductions that can also be used by another Party to fulfil its nationally determined contribution, and deliver an overall mitigation in global emissions.

This new mechanism would build and replace the emissions removal and reduction units under the KP, which originated from the Clean Development Mechanism. Further rules and modalities of the Sustainable Development Mechanism (SDM) have been developed by the SBSTA, yet the negotiations during COP25/CMA2 did not lead to the adoption of any decision on Article 6 of the PA. Instead, the SBSTA and the SBI were requested to develop recommendations on the potential institutional structure of the SDM and on procedures and modalities to be incorporated under Article 6 (Para. 2).

- Other non-market and voluntary approaches (Article 6, Para. 8).

While not mentioned explicitly in the PA, some developing country Parties have harnessed the momentum behind the collective mitigation processes developed previously under the UNFCCC, i.e. Nationally Appropriate Mitigation Actions (NAMAs) and Reducing Emissions from Deforestation and Forests Degradation (REDD+), as implementation vehicles for the mitigation goals in their NDCs – NAMAs can range from project-based mitigation actions to sectoral programmes or policies, the majority of which are submitted to the UNFCCC NAMA Registry or to the NAMA Facility (ECN, 2015).

In addition, Article 5 (Para. 1) of the PA encourages Parties to conserve and enhance carbon reservoirs (or sinks), including forests, in order to contribute to mitigation (and adaptation). Furthermore, Article 5 (Para. 2) recognizes the existing REDD+ framework, as well as the role of conservation, sustainable management of forests and enhancement of forest carbon stocks, as contributors to mitigation of emissions. While REDD+ was developed through decisions made by the COP to the UNFCCC, the specific reference to it in Article 5 of the PA gives it greater prominence and opens the door for results-based payments systems, and potentially, the concept of payment for ecosystem services (PES), to be applied more broadly (Wunder, 2005).

In adopting an approach to mitigation obligations that is based mostly on procedural obligations, the PA negotiators sought to secure wide international agreement with the PA. However, it must be recognized that this approach poses challenges in terms of the effectiveness of the measures proposed. An analysis of the first set of NDCs submitted by Parties to the UNFCCC, estimated that the aggregate effect of the measures proposed would lead to scenarios varying from a temperature increase of 3 to 4 °C (Climate Action Tracker, 2020). This implies that significant additional efforts will have to be made by Parties over the coming years to fulfil the PA's collective goal to limit temperature increase to *well below* 2 °C, including through measures addressing the agriculture sectors. This fact was confirmed by the IPCC in two of its Special Reports issued in 2018 and 2019, namely *Global Warming of 1,5° C* and *Climate Change and Land – Summary for Policymakers* (IPCC, 2018; IPCC, 2019a).

Global agriculture activity is recognized as being responsible for the largest portion of non-CO₂ GHG emissions – mainly methane (CH₄) from livestock and rice cultivation, and nitrous oxide (N₂O) from manure, nutrient management and biomass burning. The latest data from FAO reports that in 2017 the share of GHG emissions from aggregate agriculture-related activities along the supply chain, and including agriculture-related land use, was 19.8 percent of total GHG emissions (FAOSTAT, 2020). The IPCC, in a Special Report entitled *Climate Change and Land* from 2019, indicates that emissions from the agriculture, forestry,

and other land use (AFOLU) sector represent 23 percent of the total net anthropogenic GHG emissions (IPCC, 2019a). Key drivers of emissions for the sector are population growth, increasing food demand, intensive and extensive agriculture, and rising meat consumption. In defining mitigation targets and strategies within the NDCs for the agriculture and food sectors, Parties need to grapple with a set of unique challenges and not only competing priorities, such as food security and poverty eradication, economic development and environmental protection, but also with a broad and varied range of stakeholders (smallholders and family farmers, industrial/commercial farmers, fishers, indigenous populations, etc.). Accurate methodologies to measure and account for the mitigation potential of certain agricultural practices are also a challenge to define.

Given this reality, it is perhaps not surprising that most countries consider mitigation in agriculture and/or land use, land-use change, and forestry (LULUCF) as part of an economy-wide GHG target submitted through the NDCs. According to the latest available data, agriculture features in the economy-wide GHG target of 128 countries and 120 countries cover LULUCF, representing 86 percent and 76 percent of the countries respectively (FAO, 2016a). A total of 148 countries include agriculture (crops and livestock) in their mitigation measures (both economy-wide and/or sectoral) and 157 countries include LULUCF in their mitigation contributions (economy-wide and/or sectoral). Commonly cited agriculture-related mitigation actions in countries' NDCs are the reduction of the emission intensity from crop and livestock production, including adoption of techniques such as reduced or biological tillage, enhanced nutrient efficiency, improved residue management, and updates to manure handling. The IPCC Special Report on *Climate Change and Land* also cites sustainable food production, soil organic carbon management, ecosystem conservation, land restoration, and reduced food loss and waste, as options for mitigating emissions from agriculture (IPCC, 2019a). Furthermore, measures to enhance sinks can include improving soil carbon sequestration and reversing the trend of forest and grasslands conversion to cropland and pasture (FAO, 2016a). These issues, as well as their regulatory aspects, are explored in further detail in Chapter 4.

2.1.3. Adaptation

The PA has broadened the objectives of the UNFCCC by including adaptation among the primary objectives of the international law and principles relating to climate change. Article 2 (Para. 1(b)) of the PA states this objective as follows: to *“increase the ability to adapt... and foster climate resilience...in a manner that does not threaten food production.”* Furthermore, Article 7 of the PA sets the global goal of *“enhancing adaptive capacity, strengthening resilience, reducing vulnerabilities, and ensuring adequate adaptation response.”* It is noteworthy and welcome that the PA promotes the pursuit of adaptation efforts within the context of sustainable development, i.e. striving towards the achievement of climate goals without compromising other global goals, such as decent work, livelihoods, food security, gender equality and empowerment of women, as well as equity and human rights.

In addition to the overall adaptation goal of the PA, Article 7 (Para. 9) states that Parties *“shall”* engage in adaptation planning in the implementation of their respective intended actions. At the same time, the PA creates a soft obligation whereby Parties *“should”* strengthen cooperation on adaptation, including by sharing lessons learned and good practices, and by providing assistance to developing country Parties. Furthermore, Article 7 (Paras. 10 and 11) creates the procedural obligation for Parties to submit adaptation communications such as NAPs and NDCs. Studies have shown that more than 80 percent of communicated NDCs include an adaptation component, mostly in the form of a qualitative narrative, or process-based targets referencing NAPs and other related processes. Some NDCs also include quantitative adaptation goals, provide estimated costs and make a direct link to disaster risk reduction (UNFCCC, 2016a). In almost all developing countries’ NDCs, the agriculture sector is the focus of priority areas for adaptation and/or adaptation actions (FAO, 2016b).

Impacts of the changing climate vary substantively among different regions of the planet, based on location, topography, as well as social and economic conditions. This entails unique place-based climate risks and vulnerabilities, resulting in the recognition that adaptation actions

should follow a country-driven approach based on localized adaptation and resilience needs (Article 7, Para. 5). It is now well recognized that effective adaptation must engage and empower all stakeholders, including local communities, and be premised upon effective collaboration across different geographic scales and administrative boundaries (Vedeld *et al.*, 2015).

Adaptation capacities are crucial in the food and agriculture sectors, which are extremely vulnerable to climate change. Increasing climate variability and more frequent extreme weather events have a detrimental impact on agricultural production, leading to substantial economic loss for many developing countries. The situation is exacerbated for areas with particularly fragile ecosystems (such as drylands, mountains, and coastal areas) that are already struggling with many stress factors. Moreover, small-scale producers and farming communities generally possess relatively limited resources and resilience levels. This creates important challenges for them to adopt adaptation practices and cope with climate-related natural disasters. In recognition of these realities, Parties to the PA may undertake assessments of their specific climate risks and vulnerabilities, identify priorities, and explore adaptation options for the food and agriculture sectors that are most appropriate for them.

However, integrating the food and agriculture sectors into NAPs poses unique challenges (FAO, 2017b). The sectors are very diverse in scope and in levels of climate vulnerability. They encompass many different sub-sectors, such as crop and livestock production, forestry, fisheries and aquaculture, involving a broad range of stakeholders. Additionally, there is still limited certainty and accuracy in downscaling macro climate models and in determining the impact of different climate scenarios and slow-onset changes on complex agro-ecosystems. At the same time, measuring GHG emissions from agriculture is also a science that is relatively imprecise still, as is further explained in Section 2.1.6 on the PA transparency framework. This makes evidence-based adaptation planning difficult to achieve for the sectors overall. Nonetheless, there are a number of no-regret approaches (such as rainwater harvesting and increase of soil organic matter) that FAO supports, which can

be implemented to build resilience for a variety of temperature and precipitation scenarios, according to each specific context (FAO, 2014a).

As mentioned earlier, the PA advocates for adaptation processes and actions to be country-driven, gender-responsive, participatory, fully transparent, and inclusive of vulnerable groups, communities and ecosystems. Article 7, Para. 5 also envisages that adaptation planning is mainstreamed into broader socioeconomic and environmental policies, planning and measures. It is therefore essential to incorporate climate risks and adaptation needs as routine and necessary components of planning at all levels. For the food and agriculture sectors, this translates into accounting for climate considerations in all strategies, policies and decisions. Without considering climate change and its impacts at an early stage, the achievement of sectoral objectives and outcomes can be jeopardized.

2.1.4. Finance

A third collective goal of the PA is “*making finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development.*” According to Article 9, developed country Parties *shall* provide financial resources to assist developing country Parties with PA implementation (Para. 1), and other Parties are *encouraged* to provide such financial support voluntarily (Para. 2). Moreover, as part of a global effort, developed country Parties *should continue* to take the lead in mobilizing climate finance from a wide variety of sources and in achieving a balanced provision of resources between mitigation and adaptation (Para. 3). Lastly, the PA demands further obligations from developed country Parties by mandating that they *shall* provide and communicate transparent and consistent information relating to financial support every two years (Para. 5 and 7).

It has been estimated that around USD 500-700 billion per year would be needed to achieve the mitigation and adaptation objectives of the PA (World Bank, 2010; UNEP, 2016). Parties to the PA are required to increase the commitment of public funding towards climate actions and

to mobilize funds from private sources. For international climate finance flows, the UNFCCC has established a multilateral financial mechanism, which was initially operated by the Global Environment Facility (GEF) and now also by the Green Climate Fund (GCF). As of April 2020, the GCF had raised USD 10.32 billion from 49 countries (GCF, 2020). It is noteworthy that the total value of the GCF portfolio (including co-financed projects) currently amounts to USD 18.7 billion (GCF, 2019). Nonetheless, funding through UNFCCC mechanisms represents only a fraction of all international public climate finance, which includes bilateral cooperation and official development assistance. It also does not account for private finance flows, which are estimated to account for 86 percent of climate finance (UNFCCC, 2009).

Therefore, the mobilization of additional climate finance at national level, including through the private sector, is paramount to the achievement of the other goals of the PA. This also highlights the relevance of the mechanisms envisioned by Articles 5 and 6 of the PA, which can provide important new incentive tools for climate-smart funding, such as payments for ecosystem services, targeted subsidies, carbon markets, REDD+ and other results-based payments. While for the forestry sector such instruments are more developed, for other sectors like agriculture they are less so. These tools will be further analyzed in the specific context of each sector in the forthcoming chapters of this Study.

2.1.5. Technology and capacity building

Demonstrating an agreed common vision on the importance of technology development and transfer in improving resilience and reducing emissions, all Parties to the PA agreed that they “*shall*” strengthen cooperative action in this area (Article 10). The PA iterates that technological support to accelerate innovations and technology transfer “*shall*” be provided to developing country Parties. Some have observed that for the technology transfer mechanism of the PA to be effective, support to such countries should extend beyond mere technical assistance and include transfer of skills and know-how, capacity development and strengthening of enabling environments

(de Coninck and Sagar, 2015). The PA acknowledges the role of the financial mechanisms under the UNFCCC and the PA in supporting developing country Parties to overcome barriers and to gain access to and facilitate transition of climate-compatible technologies.

In terms of capacity-building, Article 11 of the PA emphasizes that all parties “*should*” cooperate to enhance the capacity and ability of developing country Parties and that developed country Parties “*should*” enhance support for this effort. Any Party engaging in capacity-building “*shall*” communicate on the actions and measures it undertakes on a regular basis. In addition, the PA calls upon developing country Parties to regularly communicate progress made on implementing capacity-building plans, policies, and actions.

As part of the adoption of the PA, COP21 in 2015 established the Paris Committee on Capacity-building (PCCB) to assess capacity needs and challenges and to promote coherence, coordination and continuous improvement in capacity-building under the climate regime.³ The PCCB’s current work plan (2016-2020) includes the identification and dissemination of good practices and lessons learned, as well as implementation tools and methodologies.

2.1.6. The ‘Enhanced Transparency Framework’

To encourage and support mutual accountability and trust between Parties, COP24 in 2018 approved additional procedural obligations of transparency. To this end, Article 13 (Para. 5) of the PA establishes the Enhanced Transparency Framework (ETF) of actions, with the aim to provide “*clarity and tracking of progress towards achieving Parties’ individual nationally determined contributions [...] and Parties’ adaptation actions.*” Submission of information and data under this framework is required at least on a biennial basis, with the exception of least developed Parties and small island developing states (Para. 90 of Add.). The PA calls for the same standards of transparency and accountability from

³ For more information on the PCCB, see: <https://unfccc.int/topics/capacity-building/the-big-picture/capacity-in-the-unfccc-process>

all Parties. Nonetheless, developing country Parties are afforded some flexibility, the details of which are still being negotiated, in accordance with their respective capacities. As Article 13 (Para. 14) states, support “shall” be provided to developing countries. The Capacity Building Initiative for Transparency (CBIT) was established to help developing country Parties meet these new transparency obligations.⁴

For transparency of mitigation actions, Article 13 (Para. 7(a)) states that each Party “shall” provide information on its national inventory report of GHG emissions by sources and removals by sinks, to evaluate changes in net emission levels against self-declared emission targets. Inventory reports need to be accompanied by information necessary to track implementation progress of mitigation actions, as well as information on which steps have been taken to initiate and operationalize mitigation interventions (Singh, Finnegan and Levin, 2016). Additionally, Article 13 (Para. 7) mandates the provision by each Party of a progress report on the implementation of their respective NDC. Furthermore, at COP24 Parties agreed to the mechanism of Biennial Transparency Reports (BRT), which is a framework for: a) each Party to provide a national inventory report of anthropogenic emissions by sources and removals by sinks of GHGs; b) each Party to provide the information necessary to track progress in implementing and achieving its NDC, as mandated by Article 4 (Para.13); c) each Party to provide information on climate change impacts and adaptation, as mandated under Article 7; and d) developed country Parties to provide the information pursuant to Article 13 (Para. 9). The first BRT and inventory reports are to be submitted by Parties at the latest by 2024.

Further work remains to be done in relation to the ETF. In the period up to COP26 in 2020,⁵ the SBSTA has been tasked to develop: a) common reporting tables and tabular formats for the electronic reporting of different types of information; b) outlines of the BRT, national inventory document and technical expert review report, and; c) a training

⁴ For more information on CBIT, see: Global Environmental Facility, 2017.

⁵ COP26, scheduled for November 2020 in Glasgow, has been postponed until further notice from the COP Bureau of the UNFCCC [as of April 2020].

programme for technical experts participating in the technical expert review (Partnership on Transparency in the Paris Agreement, 2019).

Adaptation actions are also subject to increased transparency obligations. Article 13 (Para. 8) of the PA provides that each Party “*should*” furnish information related to climate change impacts to ascertain its respective level of vulnerability as well as its adaptation capacity and resilience level. Along with the impact report, updates on adaptation policies and measures, especially progress of adaptation planning processes, need to be submitted to track their development and implementation. This can also be coupled with information on costs and needs related to adaptation to help attract international cooperation and financial and other support (van Asselt *et al.*, 2016).

Finance and technology transfer

Article 13 (Para. 9) of the PA requires that developed country Parties *shall* provide information on the support they provide to developing country Parties. In turn, Article 13 (Para. 10) creates a soft obligation on developing country Parties to provide information on support needed and received.

In addition, the PA transparency framework provides for a technical expert review of the information submitted and requires that each Party “*shall*” participate in a facilitative, multilateral consideration of progress. The technical expert review “*shall*” cover consistency with the modalities, procedures and guidelines; implementation and achievement of NDCs; and areas of improvement. Although details on modalities, procedures and guidelines for the ETF were agreed upon at COP24, the framework continues to evolve under the CMA to the PA.

Transparency, food and agriculture

Efforts to fulfil transparency obligations relating to the food and agriculture sectors face unique challenges. The GHG emissions and reductions data for the sectors are complex to assess because of the type of data required by the GHG inventories (i.e. land use data and

forest inventories). Such data often originates in and is collected in rural areas where data collection capacities and reliability of data are weaker. Capacity to analyze necessary geospatial data is also limited in developing country Parties who, at the same time, have relatively high proportions of emissions from these sectors. In order to track progress and outcomes of adaptation interventions within the sectors, appropriate indicators, adequate baseline information, and capacities at the national level, need to be developed and strengthened to better assess vulnerabilities and adaptive capacities (FAO, 2016b). To this end, FAO has outlined a framework and methodology for Tracking Adaptation in Agricultural Sectors that builds on existing indicators of sustainable development and covers the main categories of natural resources and ecosystems, agricultural production systems, socio-economic indicators, and institutions and policies (FAO, 2017c).

2.2. Relevant principles inherent in the Paris Agreement and in climate law

The PA and the KJWA (see Section 4.2) should be seen in the context of general public international law. Binding norms, including those reflected in existing treaties, are directly applicable to climate change, food and agriculture, and natural resource management. For example, the customary international law duty of states to cooperate with each other, and the duty to avoid transboundary harm, are manifestly relevant in the context of addressing climate change, as are the environmental law principles of prevention, precaution, and sustainable development. Indeed, the international environmental law principle of common but differentiated responsibilities and respective capabilities, and the principle of non-regression, are operationalized in the PA.

Being an international agreement conceived to enhance the implementation of an international treaty (the UNFCCC), and in light of its Preamble, the PA integrated a number of well-established international law principles that form its spirit and guide its implementation. More specifically, the PA incorporated some emerging norms of international environmental law, as will be analysed in the following subsections.

2.2.1. Sustainable development

The PA references sustainable development in several articles, emphasizing that mitigation, adaptation, financing and other efforts are to be done in the context of sustainable development and eradication of poverty, as well as food security.⁶ The UNFCCC also made such linkages with sustainable development, in addition to being itself one of the most important international binding agreements adopted at the 1992 Rio Conference on Environment and Development.

Addressing climate change through a sustainability lens is extremely important for the agriculture sectors, which represent a key source of livelihoods and employment for a significant share of the world population. This is especially the case in developing countries, which are the most vulnerable to climate change. Furthermore, the relevance of the agriculture sectors to the goals of food security and adequate nutrition, especially in the context of expected population growth and related demand for food, is also paramount. The reference to sustainable development in the PA means, for the agriculture sectors, that actions aimed at mitigating and adapting to climate change need to consider outcomes in the three pillars of sustainable development: economic growth and efficiency (e.g. increased production); environmental protection (e.g. avoiding negative impacts like soil degradation and biodiversity loss); and social justice (e.g. income generation and distribution, food security, gender equality).

FAO has emphasized this point, stressing for instance that mitigation efforts in agriculture need to follow a climate-smart approach which concurrently addresses the need to increase agricultural production, reduce emissions, build resilience and protect the environment. As discussed in greater detail in Chapter 4, FAO promotes the adoption of approaches such as agroecology (agroforestry, agro-pastoral systems, etc.), climate-smart agriculture, and nature-based solutions for the food and agriculture sectors (AAA Initiative, 2016).

⁶ For more in-depth analysis of sustainable development as a principle of international law, see Schrijver, 2008; and ILA, 2002.

2.2.2. Highest possible ambition and progression

In international law, the notion of non-regression emerged in the sphere of international human rights law (Prieur, 2012). Beginning with Article 30 of the *Universal Declaration on Human Rights* in 1948, and then Article 5 in both the *International Covenant on Civil and Political Rights* (ICCPR) and the *International Covenant on Economic, Social and Cultural Rights* (ICESCR) in 1966, established that once rights are recognized and guaranteed, these cannot be taken away, limited nor degraded. In the context of sustainable development, the notion of non-regression emerged during United Nations Conference on Sustainable Development in 2012 (Rio+20 Conference). The principle was clearly stated in Paragraph 20 of the outcome document of the Conference, *The Future We Want*, as follows: “it is critical that we do not backtrack from our commitment to the outcome of the United Nations Conference on Environment and Development” (UN, 2012).

On the other hand, the principle of progression implies a positive responsibility to continuously revise and enhance efforts, in contrast to the principle of non-regression which conveys a more neutral responsibility to not rollback or repeal existing measures, which could result in stagnation and inaction (Voigt, 2016; IUCN, 2016). Accordingly, Paragraph 4 of the Preamble to the PA “recognizes the need for [...] progressive response to the urgent threat of climate change (...)”, setting the scene for the integration of the “highest possible ambition” and “progression” principles into the operational requirements of the PA. To this end, Article 4 (Para. 3) provides that successive NDCs will be increasingly ambitious and reflect each Party’s highest possible ambition. This is an explicit requirement to continuously make greater efforts to combat climate change (Voigt and Ferreira, 2016a), which also finds expression in relation to the mobilization of climate finance under Article 9 (Para. 3). The transparency framework and reporting obligations of the PA are crucial elements of the PA regime that are designed to monitor the application of the progression principle at the national level. Likewise, the Global Stocktake that will take place every 5 years was conceived to assess and ensure this collective progression,

and its outcomes are expected to inform Parties in raising ambitions of future NDCs.

A noteworthy legal implication of this is that, assuming ratification and codification of the PA and its core principles into domestic law, NDC regression or stagnation may be challenged administratively and judicially in the local courts (Danneman, 2016). However, it remains, that regardless of the principle's legal force in national law, non-progressive NDCs will receive scrutiny from other Parties under the transparency framework in accordance with Article 13 (Para. 11) of the PA.

2.2.3. Best available science

The principle of “best available science”, or BAS, has been used in different instruments governing environmental conservation and management. It relates to information emerging from studies that rigorously adhere to well-established elements of the scientific process, with clear statement of objectives; well-designed conceptual models; standardized experimental methods; sound logic for analysis and interpretation; clear documentation; and high-quality peer review (Sullivan *et al.*, 2006).

While there is no explicit definition of BAS, the Preamble to the PA recognizes that an effective response to the threats of climate change must be “on the basis of the best available scientific knowledge” (Para. 4), which means that policies and actions adopted for its implementation must be informed by reliable scientific data (Craik and Burns, 2016). The PA's text further references the concept of BAS with regard to mitigation (Article 4, Para. 1) and adaptation (Article 7, Para. 5) and the principle also underpins the periodical Global Stocktake (Article 14, Para. 1).

In operationalizing BAS, each Party to the PA will need to consider how to balance it with other well-established principles, notably the precautionary principle. In essence, the precautionary principle in environmental law and policy entails that serious and irreversible threats to the environment should be promptly addressed even in absence of conclusive scientific evidence. This important principle is included as

Principle 15 of the *Rio Declaration on Environment and Development* and in Article 3(3) of the UNFCCC. Some scholars posit that should the best available scientific knowledge be uncertain, the need for an effective response to climate change threats still exists (van Wyk, 2017). In practice, Parties to the PA should not wait for scientific certainty to act on specific climate threats.

The IPCC is clearly recognized as the leading source of BAS on climate-related issues. The IPCC is an international body established in 1988 to review and assess the most recent scientific, technical and socio-economic information from around the world relevant to the understanding of climate change. Since its establishment, the IPCC has produced the most comprehensive scientific reports on important topics such as the physical scientific aspects of the climate system, including climate projections, causes and attribution of climate change; vulnerability to climate change and options for adapting to it; options for mitigating climate change; and development and improvement of an internationally-agreed methodology for the calculation and reporting of national GHG emissions and removals. As such, the IPCC is explicitly mentioned within the PA in Article 13 (Para. 7), and in the COP decisions adopting it (Paras. 21 and 31; Para. 99 of 1/CP.21).

BAS (such as the information contained in the IPCC reports) must inform and be taken into consideration by Parties when defining actions in their NDCs, and in so doing, BAS should trickle down to all levels of decision and policy-making.

The latest assessment report by the IPCC is the *Fifth Assessment Report*, published in 2014. The IPCC also publishes special reports on specific topics, for example:

- *Special Report on Global Warming of 1.5° C* – on the impacts of global warming of 1.5 °C above pre-industrial levels and related emission pathways, which provides scientific information on strengthening the global response to climate change under the *2018 Talanoa Dialogue*.

- *Climate Change and Land* – on the relationship between climate change and land, which delves deeper into issues of desertification, land degradation, sustainable land management, food security, and GHG fluxes into terrestrial ecosystems.
- *Special Report on the Ocean and Cryosphere in a Changing Climate* – focuses on the impact of climate change on the coastal and Polar Regions, the oceans and the high mountains, while addressing the effects of rising sea levels on people and the environment, and displaying different scenarios, along with climate model projections and the corresponding realities they would potentially shape.
- *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* – on methodology, with the aim to optimize the 2006 IPCC Guidelines. It contains supplementary methodologies to calculate emissions from new technologies and production processes, updates the default values of emission factors and other parameters based on new scientific knowledge, and generally elaborates on the previous Guidelines, facilitating their correct implementation.

In addition, the IPCC is preparing its *Sixth Assessment Report* to be finalized by the first half of 2022 in order to provide scientific inputs into the first Global Stocktake planned for 2023.

2.2.4. Equity

In the context of sustainable development generally, the principle of equity is expressed as: i) intra-generational equity; and ii) inter-generational equity; as reflected in Principle 7 of the *Rio Declaration on Environment and Development*. These principles are included in Article 3.1 of the UNFCCC which states that

Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities (CBDR-RC).

The principles are also reflected in the PA and in the Preamble of its Adoption Decision. In the operational provisions of the PA, it is noted that Parties should protect the climate on the basis of equity and the principle of CBDR-RC (Articles 2 and 4), in relation to efforts to eradicate poverty (Preamble, Paras. 8 and 9), to the general objective of the Agreement (Article 2), and in relation to cooperation to implement the NDCs (Article 6).

For the purposes of this Study, the equity principle is expressed interchangeably as either inter-generational equity, climate justice, CBDR-RC or gender equality.

Common but differentiated responsibilities and common but differentiated responsibilities and respective capabilities

The common but differentiated responsibilities (CBDR) principle recognizes the common responsibilities of all countries to cooperate in conserving, protecting, and restoring the environment, while recognizing the different capabilities and levels of resources available to act in this regard. It accordingly ascribes greater responsibilities to developed countries, also due to their greater historical contributions to global environmental problems, as well as their possession of higher levels of technological and financial resources required to tackle these problems (CISDL, 2002).

Within the climate change legal framework, the equity principle traditionally translates into the equity between nations or fairness among Parties, mainly regarding their responsibilities to address climate change. In more recent iterations of the equity principle, such as in the UNFCCC and the KP, Parties are divided into developed and developing countries, imparting a heavier burden on the former. These differentiations have been regarded as equitable burden-sharing because they at the same time account for the fact that developed countries are principally responsible for the current high levels of GHG emissions and for the priorities of developing countries towards economic and social development and poverty eradication (Article 4, Para. 7). However, the playing out of this principle has naturally run into some difficulty in line with evolving

definitions of developing and developed nations, in particular regarding the impact of the emerging economies. Notwithstanding the fact that the PA embraces the CBDR/CBDR-RC principle, and makes numerous references to it (Preamble, Para. 3; Article 2, Para. 2; Article 4, Paras. 3 and 19), it operationalizes the principle in a different manner to that of the KP. Doing away with differentiated obligations of results, the PA promotes self-differentiation through the NDC mechanism which allows Parties to tailor their contributions in accordance with their own priorities and capabilities. The principle is also made more dynamic in that it also includes the phrase “in light of different national circumstances” (Article 2, Para. 2). The frequent reference in the PA to national capabilities and circumstances (e.g. Article 4, Para. 4; Article 13, Para. 12; Article 15, Para. 2), which are not always accompanied by CBDR-RC, points towards an increased acknowledgement of national circumstances and, to a certain extent, a shift from the pattern of historical responsibilities (Biniaz, 2017). These notions will accompany the implementation of the PA over time as was shown by a decision made at COP24 (*Decision FCCC/CP/2018/L.22*), which also requires a Party to provide information on why it considers its NDC to be fair and equitable, and representing the highest possible level of ambition.

In the context of the equity principle, the principle of inter-generational equity, which expresses the notion that each generation should conduct itself in such a way that subsequent generations will have comparable opportunities, resources and a quality of life, has become widely accepted. In an environmental context, this means that “every generation needs to pass the Earth and our natural and cultural resources on in at least as good condition as we received them” (Weiss, 2008). In the context of the global climate regime, inter-generational equity calls for ambitious measures to prevent catastrophic and irreversible effects of climate change for future generations, as outlined in the *UNESCO Declaration on the Responsibilities of the Present Generations towards Future Generations* (1997).

Gender equality

Another concept that features prominently in the Preamble of the PA is gender equality. In developing countries, women are frequently responsible for securing water, food and energy for families and lead different household and entrepreneurial activities but suffer disproportionately from the effects of climate change. As women constitute the majority of the world's poor (UN, 2015a) and are more dependent on natural resources for their livelihoods, they are more vulnerable than men to shifting climate patterns and the resulting cascade of adverse socio-economic impacts. Limited access to productive resources, land, markets, decision-making and knowledge, as well as other social, economic and political barriers, only compound the difficulties faced by women in developing countries to adapt and be resilient (Dube, 2014).

One of the approaches to promote gender equality in the current climate framework is to require that climate actions be gender responsive. The PA anchors this approach in Article 7 for adaptation and in Article 11 for capacity-building. Further, COP 23 to the UNFCCC established the Gender Action Plan, which notes that

gender-responsive climate policy continues to require further strengthening in all activities concerning adaptation, mitigation and related means of implementation (finance, technology development and transfer and capacity-building) as well as decision-making on the implementation of climate policies

and sets out five main areas for priority focus (UNFCCC, 2018). In pursuing gender responsiveness, the differences between men and women with regards to access and control over resources, knowledge and capacity, participation, decision-making power and leadership, as well as barriers, social norms, and power relations must be taken into account before devising policies, programmes and measures to respond to these different needs and interests with the aim of achieving gender equality (UNDP, 2016).

Empowered women, in addition to reducing the power inequalities relative to men, can also play an important role as agents of change for mitigation of emissions. There is also evidence that women contribute to climate change differently to men due to different consumption patterns. Women in developing countries are often the primary collectors and users of traditional biomass fuels such as wood, charcoal and agricultural waste, as well as of water (EIGE, 2012). They make many of the decisions that determine how a household utilizes these resources which has a direct correlation with emissions. In such a context, women can be seen as holding the key to lowering emissions and enhancing sinks in developing countries (UN Women, 2015).

Protection of gender equality in the law is of fundamental importance at national level. This can be done at constitutional level, as well as in dedicated provisions in national law on sectors such as land and natural resources tenure rights, civil rights, and others. These issues will be discussed in further detail through concrete examples in the subsequent chapters of this Study.

Climate justice

A final aspect of equity that has been gaining prominence, and is acknowledged in the Preamble to the PA, is that of climate justice. Climate justice, on a theoretical level, refers to the upholding of equity with regard to current and future impacts of climate change. It is anticipated that the consequences of climate change will raise serious justice issues such as food scarcity and poverty, and loss of livelihoods for large parts of the population, for example, farmers and their families who will see their lands and production levels affected by changing temperatures and rain patterns; and climate-induced migrations and displacement of populations due to disasters and sea level rise, which might also cause a change in natural borders and marine exclusive economic zones. The concept of climate justice links the protection of human rights to climate change and promotes a human-centred approach to safeguarding those rights that might be affected by climate change, and the equitable and fair distribution of burdens and benefits (Mary Robinson Foundation, 2020).

Indeed, the conceptualization of climate justice acknowledges that the adverse effects of climate change are not equally distributed and that vulnerable groups such as the poor, women, children, indigenous people, and others face disproportionate risks and burdens, and that such groups tend to contribute the least to global GHG emissions. Climate justice places priorities on urgent mitigation to ameliorate this undue burden and on enhanced support for increasing the adaptive capacities of the most vulnerable (Schlosberg, 2012). The concept also calls for greater participation of all stakeholders in climate decision-making, as well as the distribution of accountability for fulfilling obligations from the PA to all levels (Cameron, Shine and Bevins, 2013). In 2017, an important inclusion to the PA and climate change talks was acknowledged through *Decision 2/CP.23*, establishing the Local Communities and Indigenous Peoples Platform (LCIPP).

On a more practical level, climate justice is being played out increasingly in so-called climate litigation, i.e. the use of litigation to advance climate change goals and promote climate justice. The strategic use of litigation has been applied in many instances to advance issues such as the protection of human rights, e.g. the right to a healthy environment and the right to food (IDLO, 2015). More recently, litigation has also been used to advance climate change goals, in particular to hold governments accountable for climate change obligations and to protect human rights infringements related to the impacts of climate change.⁷ Box 2.1 and Box 2.2 contain examples of prominent litigation cases on climate change.

⁷ For a comprehensive overview, refer to the Grantham Institute website: <http://www.lse.ac.uk/GranthamInstitute/climate-change-laws-of-the-world/>; and the Sabin Center of Climate Change Laws for a database of litigation in the USA: <https://climate.law.columbia.edu/>

Box 2.1
State of the Netherlands v Urgenda Foundation

In the case of *State of the Netherlands v Urgenda Foundation* the district court of the Hague in 2015 found that the State of the Netherlands was in contravention of the right to life and right to respect for private and family life under Article 2 and 8 respectively of the *European Convention on Human Rights (ECHR)*, by failing to pursue a more ambitious greenhouse gas emissions target. Guided by the Netherlands obligations under the Paris Agreement, the court ordered the State to reduce emissions by at least 25 percent by the end of 2020. The Hague Court of Appeal upheld the District Courts ruling, concluding that by failing to reduce the emissions by at least 25 percent by the end of 2020, the State was acting unlawfully in contravention of its duty of care under the ECHR.

Box 2.2
Ashgar Leghari v Federation of Pakistan

In the Pakistani case of *Ashgar Leghari v Federation of Pakistan*, Ashgar Leghari, a Pakistani farmer sued the Pakistani Government in 2015 for failure to carry out the national climate change policy of 2012 and the framework for implementation of the climate change policy (2014-2030). It was held that the delay in achieving the targets set in the framework resulted in offending the fundamental rights of citizens. The court ruled that Pakistan's delay in implementing its national climate change policy 2012 and the framework for implementation of climate change policy of 2014 (that outline national climate change adaptation and mitigation plans) breached the rights to life, human dignity, information and property under Articles 9, 14, 19A and 23 of Pakistan's constitution. Using a mutually informed approach, the court ruled in favour of enforcement of the climate change framework.

Box 2.3

Summary of main obligations arising from the Paris Agreement

The PA has established several common obligations for all its Parties. Though these may be nuanced with regards to details, time frames, flexibility and support levels, taking into account CBDR-RC, in light of different national circumstances, Parties to the PA must pursue efforts to progress towards the agreed goals.

- **Mitigation**
 - Prepare and communicate an NDC, with accompanying guidelines for information, every five years.
 - Pursue domestic GHG mitigation measures, leading to the achievement of the contributions outlined in the NDCs; the types of mitigation measures that are to be undertaken will be a matter of discretion at national level, respecting nonetheless the overall collective goal to hold global temperature increase to well below 2 °C above pre-industrial levels.
 - Successive NDCs will represent a progression and reflect the highest possible ambition at national level.
- **Adaptation**
 - Engage in adaptation planning processes and implementation of respective actions;
 - Submit an adaptation communication as a component of or in conjunction with other communications and documents (e.g. NDCs).
- **Transparency**
 - Submit a national inventory report of GHGs and a progress report to evaluate changes in net emission levels against emission targets contained in the NDC.
 - Submit information under the enhanced transparency framework.
 - Participate in a facilitative, multilateral stocktaking process with respect to implementation and achievement of the NDCs.

Box 2.3 (cont.)

- Technology
 - Strengthen cooperative action on technology development and transfer.
- Public participation and engagement
 - Cooperate in taking measures, as appropriate, to enhance climate change education, training, public awareness, public participation and public access to information.

Box 2.4

Differentiation of obligations between developed and developing country Parties to the Paris Agreement

- Finance
 - Developed country Parties shall provide financial resources to assist developing country Parties in continuation of their existing obligations under the UNFCCC, with respect to the implementation of the PA;
 - Developed country Parties shall provide and communicate information relating to financial support every two years.
- Transparency
 - Developed country Parties shall provide information on financial, technology transfer and capacity-building support provided to developing country Parties.

2.3. Concluding remarks: climate change and agriculture moving forward

The COP 23 *Decision 4/CP.23* on the adoption of the KJWA in November 2017 represented a major step towards integrating and mainstreaming agriculture, food security and nutrition into the processes of the UNFCCC. Under this landmark Decision, countries agreed to work together to achieve the multiple goals of sustainable agricultural development, increased food security and reducing emissions from the agriculture sector. The joint work is to address six topics related to soil, livestock, land nutrients and water management, as well as the food security and socio-economic impacts of climate change across the agricultural sectors. This work programme shall operate at least until COP26 and is managed jointly by the two permanent subsidiary bodies of the UNFCCC, the SBSTA and the SBI.

This Decision is considered a landmark because up to 2017, UNFCCC Parties had only exchanged views, knowledge and experience on issues relating to agriculture under the auspices of the SBSTA.⁸ Some have observed that the KJWA signalled a transition towards implementation of practical climate actions in the food and agriculture sectors (CGIAR, 2017). By involving the SBI, whose mandate is to advise the COP on issues relating to the effective implementation of the UNFCCC and the PA, Parties have made progress in translating the scientific and technical outcomes of the five KJWA workshops into concrete activities to address the significant level of emissions from the sectors and the increasing climate vulnerabilities of farmers' livelihoods and food security.

This process is expected to incentivize and provide more guidance to Parties on how to address climate change in agriculture, and will therefore be instrumental for Parties to meet their obligations under the PA and commitments under their NDCs that are related to the sectors. Currently, the non-exhaustive list of priorities of the programme are soil carbon, water management, nutrient use, manure management,

⁸ A full history of the issues relating to agriculture in UNFCCC process can be found at http://unfccc.int/land_use_and_climate_change/agriculture/items/8793.php

livestock management, and adaptation, its co-benefits and resilience, as well as socioeconomic and food security dimensions. The last topic can be interpreted as encompassing issues related to poverty eradication, equity, human rights, and public participation.

It is anticipated that the scope and content of the KJWA work process will continue to evolve during the course of its implementation, and additional topics may yet be introduced (ICTSD, 2017). Moreover, the association with the SBI may also open doors for the KJWA to build closer collaborations with the other UNFCCC bodies focusing on means of implementation (finance, technology transfer, and capacity building). This may result in enhanced access to support by the actors in the sector for their climate actions. Eventually, the KJWA may go beyond the setting of policy approaches and raise the prominence of agriculture to the level that it will be included as one of the operative articles in future international climate treaties. The evidence for such potential trajectory was the integration of REDD+, which started as joint discussions in both the SBSTA and the SBI, in Article 5 of the PA.

These recent developments emphasize that integrated approaches for climate change and agriculture will be increasingly addressed over the coming years. At the same time, there is a need for law and policy to support the implementation of concrete measures in practice. The next chapters will take a closer look at the role of legislation in the translation of these international commitments into national action.

Chapter 3. The role of legal frameworks to achieve climate change goals

Legislation is instrumental in anchoring climate change goals into binding instruments that create rights and obligations that identify duty bearers and rights holders. While the existence of policy frameworks on climate change at national level is of key importance to express a vision and create goals for the government and other stakeholders, these do not generate obligations with legal force, nor form an effective basis for accountability.

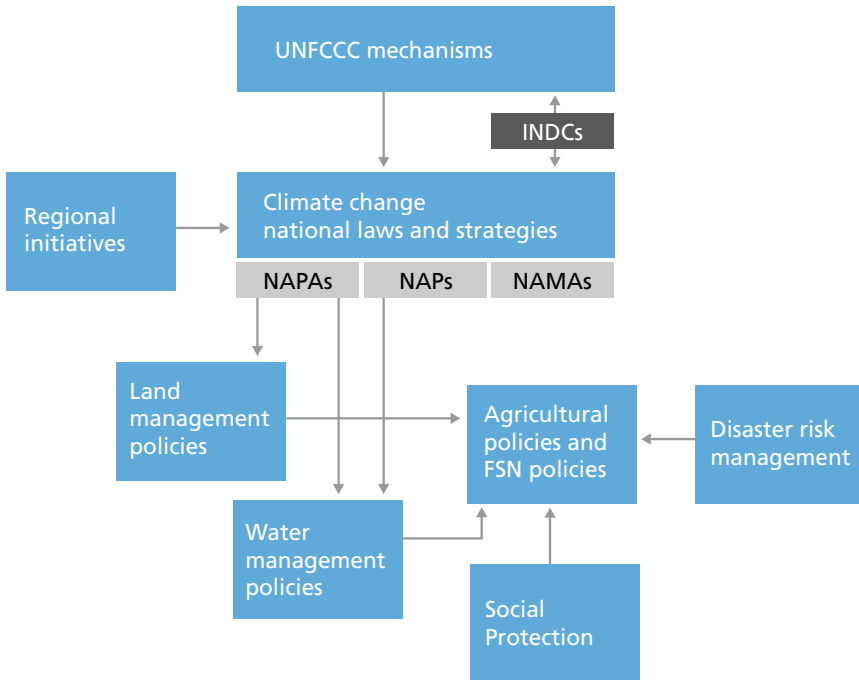
Legislation is widely recognized as a key element for the realization of sustainable development goals (IDLO, 2014), and its roles are manifold. For the purpose of this Study, three roles in particular are highlighted, for which legislation is of prime importance:

- **Creating binding frameworks:** laws and regulations are instruments that set guiding principles, targets, obligations, as well as rights, which can be enforced via judicial mechanisms. Legislation is required to translate the commitments made by a country under international climate change law (such as the PA), into nationally enforceable targets and plans for government, be it through framework or sectoral legislation, as will be furthered explored.
- **Creating institutions:** well-designed institutional frameworks are key for the fulfilment of policy goals and laws aimed at supporting climate change mitigation and adaptation. Institutions are themselves also created by laws and regulations that create and determine their mandate and functions, which will include responsibility for enforcement mechanisms foreseen for implementation of the law. For climate change, institutions play a key role for instance in leading climate action at all governance levels or in acting as coordinating mechanisms among the

different sectors involved, as well as with civil society and other stakeholders.

- **Empowering people:** legislation has the potential to empower people/rights holders to uphold their rights and to hold those responsible for its implementation accountable. Legislation can also create mechanisms for public participation, access to information and access to justice, which are crucial for good governance. Participation in decision-making and access to information about government plans empowers citizens to express these rights and hold their governments to account, to seek enforcement of laws, as well as to prevent and seek remedies for alleged violations of the law.

Figure 3.1
From international commitments and mechanisms to national policies and institutions



Source: The State of Food and Agriculture (FAO, 2016c).

3.1. Implementing climate change goals at national level

Unless a legal system is monoist, ratification of the PA will require its explicit incorporation into national law, including through legal and regulatory instruments to implement the procedural obligations it contains, such as those relating to the provision of information and the transparency framework (analysed in Chapter 2 of this Study).

The specific goals established in a Party’s NDC would require translation of those commitments into appropriately designed legal and policy

instruments. As mentioned previously, while policy documents provide a vision and objectives for climate action for governments and other stakeholders, legislation creates binding frameworks that have an enabling role for the fulfilment of such goals through the creation of rights and obligations, institutions and mechanisms, to enforce rights and obligations and to empower people.

3.1.1. Methods and legal tools

The avenues pursued for the achievement of climate goals at national level will depend on country specific contexts (socioeconomic and legal/institutional), challenges and priorities. The main avenues considered in this Study are:

- integrating economy-wide mitigation and adaptation targets into a framework climate law, which will then be complemented by other laws that refer to different sectors, including agriculture;
- introducing specific climate change related measures into pre-existing sectoral laws (e.g. laws and regulations that set out mitigation and/or adaptation measures in laws governing the food and agriculture sectors.

3.1.2. Types of legal tools

Climate change goals can be tackled through various types of legal tools. First, there are the so-called “command and control” instruments, which are more traditional mechanisms for the direct imposition of standards and rules on compliance – these may relate to pollution control, technology or reporting requirements. Second, there has been an increasing use of market-based instruments, such as taxes or emissions trading schemes. Climate change requires both these regulatory measures and instruments that create incentives, and these should be designed to create legal certainty along with appropriate levels of flexibility.

For the agricultural sector to effectively contribute to mitigation and adaptation objectives, legislation may be needed to introduce new targets and goals for the sector, as well as the means to achieve them.

Before undertaking steps in this regard, it is useful for states to carry out a detailed review of the existing legal and institutional framework to identify any gaps, inconsistencies and missing implementing legislation that could hamper the implementation of a climate change policy instrument (e.g. a climate change strategy or the NDC). For the purposes of this Study, it is recommended that a legal assessment cover all relevant areas of legislation that have a bearing on agriculture, land use and management, forestry, fisheries, and environmental protection, in addition to other areas of legislation and regulations on taxation, labour, investment, corporations, and personal laws. The latter are relevant because they determine an individual's ability to enter into contracts, access financial institutions and seek judicial remedies.

3.1.3. Assessment tools

Several guiding documents exist to support governments in undertaking such legal assessments, which can be instrumental for providing an accurate understanding of which legislation might be more suitable for each national context.

Box 3.1 Examples of Assessment Tools

Responsible Governance of Tenure and the Law: a guide for lawyers and other legal service providers (FAO, 2016d), which contains detailed guidance in undertaking legal assessments of national legislation according to the *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security* principles.

The Role of Legal Instruments to Support Green, Low Emission, Climate Resilient Development: a Guidebook on assessing, selecting and implementing legal instruments. The purpose of this Guidebook is to provide guidance to government decision makers and their advisers on best practices in designing or modifying legal frameworks and specific legal instruments aimed at effectively supporting green, low-emission and climate-resilient development. In doing so, it provides guidance on how to: assess the

Box 3.1 (cont.)

legal frameworks and instruments required for successful implementation of Green Low-Emission and Climate-Resilient Development Strategies (LECRDS); select appropriate legal instruments for implementing Green LECRDS; and implement the legal instruments that have been selected (UN, 2013).

Law and Climate Change Toolkit [online] (<https://lcc.eaudeweb.ro/>) This Toolkit is designed for use by national governments, international organizations and experts engaged in assisting countries to implement national climate change laws, as well as any academia and research institutions that are undertaking analysis of the growing body of climate change related legislation throughout the world (UN, UNEP and The Commonwealth Secretariat, 2020).

3.1.4. Harmonization and coordination of laws

To ensure the effective implementation of new laws and other legal provisions, it is essential that they are consistent with existing ones, which requires the identification of any existing provisions requiring repeal or revision. Some states will choose to include a list of repealed instruments in a new law or amendment. This approach is seen, for example, in Mauritius's *Forests and Reserves Act 1983 (Act No. 41)* and *Native Terrestrial Biodiversity and National Parks Act 2015 (No. 14 of 2015)*, which requires the legislator to identify all the linkages of the proposed change with other legal instruments and to organize the orderly repeal of any conflicting provision or instrument. This contributes greatly to clarity of the legal framework and to a common understanding by all actors in a given sector of their rights and obligations under the law. It also reduces opportunities for conflict in the interpretation of the legislation.

Once there is clarity on the chosen climate change goals, and an assessment of the legal and institutional framework to support

their implementation is undertaken, countries can undertake law reform accordingly.

The following sections take a closer look into the two avenues that can be considered when implementing climate change goals through national legislation:

- i. the introduction of ‘framework climate change legislation’, a trend many countries have already pursued to coordinate climate action;
- ii. legislating on cross-cutting issues that should be considered by policymakers when developing or reviewing legislation for climate change in any sector, including in the agricultural sectors.

These considerations are preliminary to the analysis of specific sectoral legislation that will be undertaken in subsequent chapters.

3.2. Framework climate change legislation

Framework legislation has been defined as a

law or regulation with equivalent status, which serves as a comprehensive and/or unifying basis for climate change policy, addressing multiple aspects or areas of climate change mitigation or adaptation (or both) in a holistic, overarching manner.

Such framework laws have been shown to encourage a strategic and coordinated approach to climate policy and to act as a catalyst for further climate policy and laws. It is considered that implementing the PA, given its short and long-term overall goal, requires a stable, long-term and overarching approach to support climate governance (Nachmany, 2015). The passing of such framework laws became a trend which peaked in the mid-2010s (Grantham Research Institute, 2018). Such legislation will typically contain legally-binding GHG emission reduction targets, GHG emission budgets, review systems, and will create independent institutions to support decision-making and institutional coordination, all of which are considered essential for implementation of the PA (Meyer-Ohlendorf, 2018).

Given the interest in framework climate change legislation, several model climate change framework laws have been developed over the past years. Institutions such as the Parliament of Latin America and the Caribbean (Parlatino), the Environmental Law Institute (ELI), and the Nordic Council have each developed such models. This section looks into the scope of a select number of framework climate change laws with regards to the obligations established in the PA (as discussed in Chapter 2), as well as with regards to legislation in the agriculture sector and how this relationship can be dealt with to improve the effectiveness of climate action.

Comparative analysis of existing framework climate change laws across the globe shows that such instruments can be grouped primarily into three different categories: i) those that are limited to designating or creating a (new) institutional framework for climate change, e.g. committees or commissions; ii) those that, in addition to the above, envision climate change mitigation measures; and iii) those that contain the elements of the first two and also address adaptation measures and other types of climate regulatory measures (Moraga, 2016).

Moreover, each of these three categories contain different types of measures, as shown through the examples provided in the following subsections.

3.2.1. Different institutional mechanisms established under climate change framework laws

With regard to the institutional setup for dealing with climate change, the options chosen by states range from simply nominating an authority to be in charge of climate issues, to the creation of specialized inter-sectoral commissions or committees to coordinate climate action, combined with mechanisms to enable public participation and consultation with entities outside of government such as civil society, the private sector and academia.

For example, in Brazil, an Inter-Ministerial Commission on Climate Change (CIMGC), headed by the Ministry of Science, Technology and

Innovation, was created in 1999 to bring together relevant ministries to coordinate implementation of the UNFCCC. Among its tasks, the CIMGC issued opinions upon request on proposals for sectoral policies and legal instruments that contained a mitigation and adaptation component. It also provided input to government position papers during UNFCCC sessions and other subsidiary negotiations, and coordinates with civil society organizations to promote actions by governmental and private bodies, in compliance with Brazil's international commitments. In addition, an Inter-Ministerial Committee on Climate Change (CIM) was created by *Decree No. 6 263/2007 instituting the Inter-Ministerial Committee on Climate Change (CIM) (2002)*.

Between November 2019 and February 2020, the CIMGC was abolished and the CIM was reformed via two Presidential Decrees (*No. 10 223/2020 and No. 10 145/2019 abolishing the Inter-Ministerial Commission on Climate Change and reforming the Inter-Ministerial Committee on Climate Change*). According to the latter Decree, the CIM has the purpose of establishing guidelines, and articulating and coordinating the implementation of public actions and policies related to climate change in the country. Among its specific functions, the CIM shall: i) deliberate on the country's strategies for the elaboration, implementation, financing, monitoring, evaluation and updating of policies, plans and actions related to climate change, among which the successive NDCs under the PA; ii) monitor the execution of the NDCs and of activities of transparency and provision of information, in compliance with the decisions of the UNFCCC; and iii) propose updates to the National Policy on Climate Change. In terms of its composition, the CIM has a Council of Ministers as a decision-making body, composed of the Ministers of State in the following areas: the Chief of Staff of the Presidency of the Republic, who will preside over it; foreign relations; economy; agriculture, livestock and supply; regional development; mines and energy; science, technology, innovations and communications; environment; and infrastructure. Ad hoc participants might be invited, but without the right to vote, such as representatives of public bodies and entities, and personalities of recognized knowledge on the subject.

The United Kingdom of Great Britain and Northern Ireland's *Climate Change Act 2008 (Chapter 27)* follows a different institutional approach by ascribing overall responsibility for implementation of the Act to central Government. In accordance with the Act, the Secretary of State for energy and climate change shall provide annual indicative ranges for national net carbon emissions, shall account, prepare and report on proposals and policies to meet the carbon budgets laid down in the Act, shall prepare an annual statement of the country's emissions for the Parliament in accordance with international carbon reporting practice, as well as prepare a final statement for each budgetary period and a final statement for 2050. The Secretary of State must report at least every 5 years on the risks of climate change faced by the country, and publish programmes setting down adaptation objectives, as well as timescales and priorities. The Secretary of State has the power to require public bodies and statutory undertakers to carry out their own risk assessment and make plans to address those risks. The Act also creates the Committee on Climate Change (CCC) which is characterized as an independent, non-departmental public body that advises the central and devolved governmental authorities and parliaments on tackling and preparing for climate change. The Act's creation of an independent advisory body which ensures evidence based decision-making and safeguards against political backsliding has been hailed as one of the key features behind the Act's success. As an independent expert body, it is in charge of advising the Secretary of State on the 2050 target, on the level of carbon budgets, and on where cost-effective savings can be made. It also submits annual reports to Parliament on progress towards targets and budgets. The Government must respond to the reports, ensuring transparency and accountability, and guidance and directions may be given to the Committee by national authorities in relation to matters within the scope of their activity.

Similarly, in Australia, the *Climate Change Authority Act (2011, as amended in 2019)*, creates the Climate Change Authority which is charged with advising the Government (relevant ministers) on several issues, including: the land sector's resilience to climate change; the improvement of long-term farm productivity; measures to assist landholders and regional

communities to benefit from the reduction of GHG emissions from the land sector and to benefit from sequestration of carbon in soil, in living biomass, or in dead organic matter; the Biodiversity Fund program and measures that protect, manage or restore biodiverse ecosystems; and on carbon restoration levels in living biomass, or in dead organic matter.

3.2.2. Framework laws containing mitigation measures

Substantive mitigation measures, such as the setting of GHG emission reduction targets and/or a carbon budget, are featured frequently in framework climate change laws. For example, in Mexico, the *Ley General de Cambio Climático (2012, amended in 2016)*, puts into law the Government's commitment (pledged during the negotiation of the *Copenhagen Accord*) to reduce emissions to 30 percent by 2020 (Transitory Articles, Article 2). Article 31 establishes that the national policy on mitigation shall include plans, programmes, actions and regulatory instruments that are to be implemented in accordance with Mexico's international commitments.

In the case of the United Kingdom of Great Britain and Northern Ireland, the *Climate Change Act* originally bound the Government to reduce emissions by at least 80 percent of 1990 levels by 2050, and to contribute to global emission reductions to limit global temperature rise to below 2 °C above pre-industrial levels. In June 2019, the Government passed the *Climate Change Act 2008 (2050 Target Amendment) Order 2019 (S.I. No. 1 056)* which sets a national target that will require the country to bring all GHG emissions to net zero by 2050, making it the first G7 country to legislate for net-zero emissions. To meet these targets, the Government has set five-yearly carbon budgets, which currently run until 2032, and which provide legally-binding emission limits in successive five-year periods to drive progress towards the 2050 target. The country is currently in the third carbon budget period (2018 to 2022). This type of measure can play an important role as a binding reference target that all sectors must comply with, thus acting as a way to mainstream climate change goals in the relevant sectors of the economy.

3.2.3. Instruments used in framework laws

Another common feature in climate change framework laws are the types of instruments envisioned to guide and support climate action. Planning instruments and NDCs are clear examples.

The Philippines' *Climate Change Act of 2009 (Republic Act No. 9 729)*, establishes a Climate Change Commission and calls for the participation of national and local governments, and various stakeholders, in the prevention and reduction of climate change effects. It also highlights the need for adaptation actions tailored to local needs, as well as actions integrating disaster risk reduction. As a means to promote implementation, the Act mandates several planning instruments:

- i. A Framework Strategy and Program on Climate Change: The Commission has the obligation to develop a Framework Strategy within six months of the coming into effect of the Act. The *National Framework Strategy on Climate Change 2010-2022* was published in April 2010. Subsequently, a Program is to be formulated based on the Framework Strategy to address research and development, and monitoring of activities to protect vulnerable communities from the negative impacts of climate change. The components of the Framework Strategy are to cover issues such as impact assessments, research, monitoring and reporting, and gender mainstreaming. Through an amendment of the Act, climate financing was included as one of the main components of the Framework Strategy.
- ii. A National Climate Change Action Plan is to be issued by the Commission (within one year of the coming into effect of the Act). The first *National Climate Change Action Plan for 2011-2028* was published in April 2010. It sets out guiding principles and information on the resources available to implement specific actions, as well as their projected outcomes. This strategy document will serve as a roadmap for the coming decades and as the basis for local action plans.

- iii. A Local Climate Change Action Plan: Local governments are required to develop local action plans to address local priorities, in compliance with the Framework Strategy, the National Climate Change Action Plan and the Local Government Code. These local plans are to be updated regularly and the Commission shall be informed of the amendments within one month of their adoption.

Another example is the Peruvian *Ley N° 30 754 – Ley Marco sobre Cambio Climático* of 2018, which is innovative in that it ascribes legal force directly to the NDCs of Peru. Chapter III of the Law lists the National and Regional Climate Change Strategy, the NDCs, and other related instruments as “comprehensive management instruments for climate change” (Article 12). Such instruments have legally-binding force on all competent authorities who are to consider them in their institutional budgets. It is recalled that the PA does not determine the legal nature of NDCs, thus the fact that this Framework Law renders them legally-binding at national level represents a measure of great importance to strengthen potential implementation outcomes of the NDCs.

Transparency mechanisms are another prominent feature of framework laws. In the Republic of Korea, the *Framework Act on Low Carbon, Green Growth (Act No. 9 931 of 2010, as amended by Act No. 14 122 of 2016)* establishes a framework to guarantee a sustainable and low carbon economy. A number of Presidential Decrees have been promulgated to enforce the Act. The main Act creates a monitoring and reporting mechanism for emissions of GHGs and for the quantity of energy consumed. The Government is in charge of managing the statements received by each entity that emits GHGs and each entity that consumes energy, referred to as controlled entities under the Act, and has the duty to disclose the information gathered to the public, unless a request for confidentiality is submitted by the entities to protect trade secrets. To enhance transparency among the authorities in charge, the Act allows the Presidential Committee on Green Growth (established under Article 14) to request the head of a central administrative agency, local government or public institution to submit information or data. The Government and the head of each central administrative agency has the duty to report to the National Assembly, respectively, on the national strategy for green

growth and the central action plans. Results of performance shall also be reported to the National Assembly by the end of February of the following year.

Principles and priorities are mentioned by several framework climate change laws. In Guatemala, the *Decreto N^o 7-2013: Ley marco para regular la reducción de la vulnerabilidad, la adaptación obligatoria ante los efectos del cambio climático y la mitigación de gases de efecto invernadero* (framework law to regulate vulnerability reduction, mandatory adaptation to the effects of climate change and the mitigation of greenhouse gases) of 2013, features seven principles that should guide implementation:

- i. *“In dubio, Pro Natura”*: when there is doubt regarding the effect of an action on the environment, decisions should be taken so as to protect the environment.
- ii. The “polluter pays” principle: establishes an obligation to cover the costs of compensation for damages to the environment on every individual or legal entity responsible for the damage caused.
- iii. Ensure gender, ethnic and cultural relevance when developing actions, plans, and programmes relating to climate change.
- iv. Take measures to prevent, deter and reduce the causes of climate change and mitigate its adverse effects.
- v. Identify and promote traditional and ancestral good practices for a more sustainable use of resources.
- vi. Do not exceed the capacity limits of the ecosystem.
- vii. Enhance inclusive public participation in the development of action plans and programmes.

Stating such principles and priorities explicitly in climate change framework legislation informs a more sound interpretation of the law, and can ensure that implementation of climate change related measures encompasses issues that should not be overlooked.

Another such example is the Argentinian *Ley N° 27 520 de presupuestos mínimos de adaptación y mitigación al cambio climático global* of 2019. This Law establishes the minimum environmental protection requirements for adaptation and mitigation of climate change. More specifically, the objectives of the Law are: a) to establish the strategies, measures, policies and instruments related to the study of the impact, vulnerability and adaptation activities to climate change that can guarantee human and ecosystem development; b) assist and promote the development of mitigation and reduction strategies for greenhouse gases in the country; c) reduce human and natural systems' vulnerability to climate change, protect them from their adverse effects and take advantage of their benefits. The Law establishes the principles that must inform public policy on mitigation and adaptation to climate change, namely: a) common but differentiated responsibilities; b) mainstreaming climate change in state policies; c) priority setting (the needs of social groups that are more vulnerable to climate change should be prioritized); and d) complementarity between mitigation and adaptation actions. In order to implement the Law, it creates the National Cabinet of Climate Change, chaired by the Chief of the Cabinet of Ministers, whose function is to oversee the implementation of the National Plan of National Public Administration Adaptation and Mitigation of Climate Change.

The inclusion of financial tools and economic incentives is another essential component of framework legislation. Without the earmarking of adequate resources, the implementation of climate change goals and measures might be unfeasible or unattractive for those they concern. Many framework laws provide for the creation of climate change funds through which farmers may access financing for certain activities, which aim to capture and channel public, private, national and international financial resources. Such legislation will also typically foresee the inclusion of a specific item line in the national budget to cover the financial requirements for implementation of the law.

In Viet Nam, *Decision No. 158/2008/QĐ-TTg approving the national target program on response to climate change* was adopted into law in 2008. The Program document sets out a detailed financial mechanism, which includes an obligation for the state to ensure the necessary resources

and raise national and domestic contributions to fund the climate change responses envisioned. It also provides for tax breaks for certain activities developed under the framework of the law.

A framework climate change law can also provide a legal basis for adaptation planning by concerned authorities. For instance, as noted previously, the United Kingdom of Great Britain and Northern Ireland's *Climate Change Act 2008 (Chapter 27)* prescribes a continuous and long-term approach to adaptation, envisioning a five-year cycle that begins with a comprehensive Climate Change Risk Assessment, followed by a National Adaptation Programme. In addition to the planning cycle, the Act gives the Government the right to demand updates on adaptation actions from 'statutory undertakers' and 'bodies of a public nature' such as utility companies, through what are known as the 'adaptation reporting powers'.

Another relevant issue is the relationship between framework climate change legislation and sectoral legislation, and how the two interact. One method of establishing the linkages is that adopted by Kenya in its *Climate Change Act, 2016 (No. 11)*. This Act takes an overarching approach of mainstreaming climate change (specifically, mechanisms to enhance climate change resilience and low carbon development) into all development planning, across all levels of government, the economy and society. The Act mandates central and devolved government units to mainstream climate change responses into development planning, decision-making and implementation, through appropriate planning, research and development, training and capacity building, and integration of climate change into decision-making processes at all levels of government. The Act also sets out the duties of the public sector with regard to climate change, and these include a mandate for each state department and national government public entity to integrate their climate change action plan into their respective sectoral strategies and action plans, as well as to report on sectoral GHG emissions for the national inventory.

A more targeted approach was taken by Honduras through the *Ley de Cambio Climático* published in 2014, which was enacted with *Decreto*

Nº 297-2013. The Law requires relevant institutions and authorities to develop strategic institutional plans, which should be reviewed and updated periodically, and that are in line with the National Action Plan of Adaptation and Mitigation to Climate Change. The preparation of such plans is to be supported by several high level government officials: the Secretary of State for Natural Resources and the Environment, the Technical Secretariat for Planning and External Cooperation, the Secretary of State for Finance, as well as by all municipal authorities. As to the content of the strategic institutional plans, the Act identifies the below priority areas:

- Coastal marine areas: the Secretary of State for Natural Resources and the Environment, the Secretary of State for Agriculture and Livestock, the Secretary of State for National Defense, the Honduran Institute of Tourism, the Technical Secretariat for Planning and External Cooperation, the National Institute of Forest Conservation and Development, Protected Areas and Wildlife, and the National System of Protected Areas, are to identify and implement programmes, projects and national measures to prevent and reduce socio-environmental vulnerability in marine-coastal areas, focusing on minimizing the impacts caused by climate change on the most vulnerable and at-risk populations.
- Agriculture and livestock: the Secretary of State for Agriculture and Livestock, together with the Technical Secretariat for Planning and External Cooperation and the Secretary of State for Natural Resources and the Environment, must develop and promote plans for adaptation of the agricultural sector to the effects of climate change.
- Forest resources, ecosystems and protected areas: The National Institute of Forest Conservation and Development, Protected Areas and Wildlife, the National Council of Protected Areas, and the Secretary of State for Natural Resources and the Environment, must develop local, regional and national plans in their respective areas for the prevention and combating of forest fires, for efficient

management of protected areas and for the creation of ecological corridors and the restoration of forest ecosystems.

As can be gathered from these examples, these laws provide an important framework for climate change action at national level. While there is no single blueprint, the examples mentioned here provide insights into the types of measures that governments can use, as appropriate within their jurisdictions. At the same time, however, the existence of a framework climate change law will provide a mandate for additional legislation within each sector (e.g. agriculture and forestry) which is recommended in order to enhance effectiveness and implementation outcomes for climate change adaptation and mitigation.

As noted in the section 3.1.2, the first step for determining what action is needed in each specific context is to conduct a thorough analysis of the existing legal framework in light of existing climate change policy goals, as expressed in a national climate change policy document (or in an NDC). In this manner it will be more straightforward to assess how the existing legal framework is conducive or not for the achievement of climate change policy.

3.3. Sectoral legislation

In addition to passing framework climate change legislation, review and reform of sectoral legislation may be required before a state can effectively fulfil the climate goals it has set for itself in its NDC. As indicated previously, the interplay between a framework climate change law (if this exists or is planned) and sectoral legislation will depend on each national context. As a means of providing a general framework for such analysis, the following subsections present four cross-cutting issues that are intrinsic to the food and agriculture sectors, and which are explicitly referred to in the PA. It is the view of this Study that such issues should be integrated into sectoral laws in addition to the specific obligations and principles contained in the PA. Chapters 4 to 6 of this Study explores in more detail how legislation relating to the main areas of agriculture can be strengthened with climate change related goals and with specific measures for supporting mitigation, adaptation and resilience in those sectors.

3.3.1. Food Security

As defined by the 1996 World Food Summit, the concept of food security is defined as a scenario in which

all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 1996).

According to the UN Special Rapporteur on the Right to Food in 2015, climate change represented a substantive threat to all aspects of food security, including availability, accessibility, adequacy and sustainability (UN, 2015b). A recent IPCC report warns that

Climate change has already affected food security due to warming, changing precipitation patterns, and greater frequency of some extreme events (...). In many lower latitude regions, yields of some crops (e.g. maize and wheat) have declined, while in many higher altitude regions, yields of some crops (e.g. wheat, maize and sugar beets) have increased over recent decades (...). Climate change has resulted in lower animal growth rates and productivity in pastoral systems in Africa (...). There is robust evidence that agricultural pests and diseases have already responded to climate change resulting in both increases and decreases of infestation (...). Based on indigenous and local knowledge, climate change is affecting food security in drylands, particularly those in Africa and high mountain regions of Asia and South America. (IPCC, 2019a).

Another recent IPCC report notes that ocean warming and acidification, loss of oxygen and changes in nutrient supplies, are already affecting the distribution and abundance of marine life in coastal areas, in the open ocean and at the sea floor, with resulting shifts in distribution of fish populations and reduced global catch potentials in certain areas of the globe. Communities that depend highly on seafood may face risks to nutritional health and food security. All this is leading to negative effects on people's livelihoods, with climate-induced food price volatility and nutritional deficiencies. Additionally, such phenomena are predicted to affect an increasing proportion of the global population (IPCC, 2019b).

In this regard, when implementing NDCs, it is important to integrate food security and nutrition agendas into legal frameworks governing

food and agriculture. The Preamble to the PA makes specific reference to safeguarding food security and ending hunger. Article 2 also stresses the importance of the “ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production.” In practice, this implies that climate change responses need to be designed in a manner that does not challenge but promotes food security and nutrition. In this connection, the Special Rapporteur on the Right to Food stated in 2010 that

sustainable types of Agriculture can achieve three objectives at the same time: mitigate climate change by limiting the greenhouse gas emissions resulting from food production; increase incomes of the poorest and most marginal farmers, who form today a majority; and contribute to food availability by increased levels of production resulting from a well informed use of available agro-ecological techniques of production (De Schutter, 2010).

Food security and the right to food is related to the issue of food loss and waste and promoting the transition to more sustainable diets. FAO has estimated that one-third of edible food produced is lost each year, representing an enormous waste of the land, water, energy and other resources used to produce it and unnecessary emissions of millions of tonnes of GHGs. These changes are reported worldwide, with losses occurring throughout food value chains, both in developed and developing countries. While in the latter, food loss occurs mainly as a result of managerial and technical limitations in harvesting, storage, transportation, processing, packaging and marketing, in the former it is caused mainly by consumer behaviour and by policies and regulations that address other sectoral priorities, for example, food safety and quality standards that may remove from the supply chain, food that is still safe for human consumption (FAO, 2016b).

FAO stresses that reducing food losses and waste by increasing the overall efficiency of food chains, as well as paying due attention to dietary and consumption patterns of the population, could contribute to fight climate change. Several countries are passing legislation aimed at preventing food waste. Examples include banning supermarkets in France from

throwing away edible food and determining that such food is donated to charities for redistribution (González-Vaqué, 2017); and in the case of Italy, the use of incentives to encourage operators of the food sector to donate food to charities and food banks.

3.3.2. Poverty eradication

More than 75 percent of the world's poorest people live in rural areas, and 2.5 billion people live on small farms and are entirely dependent on agriculture for their livelihood. Small-scale producers and the rural poor in developing countries are particularly vulnerable to the effects of climate change because they live in fragile ecosystems or practice rainfed agriculture. They often have limited capacity to diversify their production systems and insufficient knowledge to fully and adequately manage climate risks. This is compounded by often weak social protection systems to help them withstand climate and other shocks. Rural households that suffer from various forms of marginalization (gender, ethnicity, precarious tenure, limited access to public services, etc.) are the least resilient (IFAD, 2014).

The PA emphasizes the relationship between responses to climate change and efforts to eradicate poverty (Preamble; Article 2; Article 4; Article 6). This is especially relevant for agricultural livelihoods in rural areas where poverty is deeply rooted and people are less resilient overall. The PA also calls for consideration of environmental sustainability in responding to climate change as it causes damage and depletion of natural resources on which agricultural production relies. This aspect also shows the interlinkage between the international legal climate change framework and the Sustainable Development Goals, which have poverty eradication as one of their cornerstones.

Strategies to reduce rural poverty in the context of climate change can include mainstreaming gender equality and social inclusiveness into climate-related planning processes. This will help ultimately to reduce distress migration, conflict over resources, and discrimination against women or particular vulnerable social groups when developing and implementing NDCs. Efforts should also be made to engage the poor

in making positive contributions to climate actions and ensure that the benefits are equitably distributed. Schemes enabling households to diversify incomes and mitigate climate-related risks should also be strengthened. Furthermore, inclusive sustainable rural transformation can reduce long-term vulnerabilities, inequalities and social instability.

According to a 2019 FAO-led study entitled *Managing climate risks through social protection - Reducing rural poverty and building resilient agricultural livelihoods*, although there are several international frameworks that can guide countries to adopt more integrated approaches to climate risk management, their effective transition into national policies and programmes is still limited. Integrating social protection schemes (social assistance, social insurance and labour market interventions) into programmes designed to reduce climate and disaster risks and promote adaptive capacity can contribute to the reduction of vulnerability to poverty and reliance on negative coping strategies, as well as provide a stepping stone towards climate resilient livelihoods for the poor (FAO and Red Cross Red Crescent Climate Centre, 2019).

3.3.3. Human rights

Paragraph 11 of the Preamble to the PA represents the first time that human rights are mentioned in a strictly climate change related international instrument. Even though it can be questioned whether the PA successfully incorporates a rights-based approach into the climate regime (Galvão Ferreira, 2016), the explicit reference in the Preamble is evidence that human rights are a key part of the PA's objectives and purpose. It is recalled nonetheless that the PA does not create standalone or additional rights but compels Parties to respect, protect, promote, fulfil and consider their respective human rights obligations when carrying out actions to fulfil the objectives of the Agreement (Mayer, 2016).

There is an overlap between obligations under international human rights and climate regimes because unaddressed climate impacts include those impinging upon fundamental rights. Ambitious climate mitigation as well as timely and inclusive climate adaptation measures can promote

the fulfilment of both climate change objectives and human rights requirements. According to the Special Rapporteur on Human Rights and the Environment, climate change threatens the full enjoyment of a wide range of rights (UNHRC, 2016), as noted in Chapter 1 of this Study.

- Rights to life and health are affected due to increase in deaths, injuries, and disease from temperature rise and climate-related natural disasters.
- Climate change is also severely undermining the right to food. All aspects of food security, namely access, utilization and price stability are adversely affected by the shifts in weather patterns. Global warming reduces the availability of water and compounds the problem of access to safe drinking water and sanitation.
- Climate change continues to contribute to forced migration and displacement, as well as to threaten the very existence of some small island developing states and their citizens' rights to self-determination.
- If unaddressed, future impacts of climate change will slow down economic growth, compound obstacles to poverty alleviation and create new poverty traps. Social groups that are socially, economically, culturally, politically, institutionally or otherwise marginalized, are especially vulnerable to consequences of climate change.
- Climate-related impacts have already led to the relocation of many indigenous communities resulting in loss of traditional livelihoods and cultural identity linked to their ancestral lands.
- Existing gender inequalities are also heightened by climate-related hazards. The PA specifically mentions gender issues in many areas (as examined in Chapter 2 of this Study), in recognition that climate change is likely to exacerbate challenges related to gender discrimination, such as in land tenure for example.

Therefore, climate action is urgent in order to avoid or minimize such impacts on human rights. In turn, human rights obligations can provide

leverages to compel governments to take appropriate action. It should be noted, however, that without proper due diligence and safeguards, some climate change responses can potentially lead to adverse impacts on human rights (Knox, 2016). For example, as noted by the *Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW)* in General Recommendation No. 37,

While climate change mitigation and adaptation programmes may provide new employment and livelihood opportunities in sectors such as agricultural production, sustainable urban development and clean energies, failure to address the structural barriers faced by women in accessing their rights will increase gender based inequalities and intersectional forms of discrimination.

Another example could be REDD+ projects implemented without strict application of procedural safeguards resulting in overlooking the rights of indigenous people related to tenure and life (UNEP, 2015). Therefore, care should be taken to balance climate change response objectives and measures, with any human rights that can be implicated by such measures.

Even though about 24 NDCs submitted already include information relating to human rights (CARE *et al.*, 2017), their mainstreaming into climate change policies and measures can still be strengthened. In order to ensure that Parties to the PA minimize human rights risks associated with their NDCs, general commitments to respect human rights, strengthen protection of the most vulnerable, as well as effective remedial procedures for all proposed climate actions can be included. In practical terms, both procedural and substantive rights can be integrated into climate projects, plans, programmes and laws. For example, impact assessment procedures can require the identification of potential adverse effects on human rights, consider alternative options with fewer or no risks to human rights, and devise proper monitoring and impact mitigation plans.

3.3.4. Procedural rights

Procedural rights are recognized under a range of international instruments and are important guarantees for individuals, and all

communities, as they provide mechanisms and avenues to hold governments to account, make informed decisions, and to participate in decision-making. Procedural rights include the right to access information, the right to consultation and participation in decision-making, and the right to seek legal remedy (UNHRC, 2018).

i. Access to information

The right to seek and receive information has a strong legal foundation in international law. It is entrenched in Article 19 of the *Universal Declaration of Human Rights* (1948), Article 19 of the *International Covenant on Civil and Political Rights* (1966), Article 10 of the *European Convention on Human Rights* (1950) and in Article 9 of the *African Charter on Human and Peoples' Rights* (1981). It requires states to collect, update and disseminate, for example, environmental information (UNHRC, 2018) and to grant all persons the right to petition public authorities to receive information with regard to the environment, without having to state an interest.⁹ The UNFCCC notes the link between access to information and climate change by requesting its Parties to promote and facilitate public access to information on climate change and its effects (Article 6.a.2).

Article 2(3) of the *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention)* of 1998, applies to ratifying states that are members of the Economic Commission for Europe (ECE), as well as states having consultative status with the ECE. It defines environmental information as any information in written, visual, aural, electronic or any other material form which pertains to *inter alia* the air and atmosphere, activities or measures, including administrative measures, environmental agreements, policies, legislation, plans, and programmes, which affect or are likely to affect the environment.

In Latin America, a recent and similar development was the adoption of the *Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (Escazú Agreement)* in March 2018, under the auspices of the Economic

⁹ For a discussion on the right to access information see IUCN, 2015.

Commission for Latin America and the Caribbean. The Agreement aims to guarantee the full and effective implementation in Latin America and the Caribbean of the rights of access to environmental information, public participation in the environmental decision-making process, and access to justice in environmental matters, along with the creation and strengthening of capacities and cooperation, contributing to the protection of the right of present and future generations to live in a healthy environment and to sustainable development.

At the national level, the right to information has already been incorporated into climate change related laws in Mexico. For example, *Decreto N° 181 - Ley de Cambio Climático del Estado de México* of 2013, allows every person to access information in relation to climate change that is generated and administered by public authorities without having to state an interest. Importantly, the Law requires the State Institute for Energy and Climate Change to publish information via an information system on climate change. The system is required to provide information regarding *inter alia* the atmospheric conditions in Mexico, foreseen emission levels, long-term projections in climate variations, as well as the vulnerability of human settlements, of economic activities, and of infrastructure to climate change. Its effects on the environment must also be documented and made available to the public.

This right is critical to people's ability to understand how environmental harm may undermine their rights, including the rights to life and health (UNHRC, 2018), and for them to be in a position to seek remedial action for any alleged violations of their right to being consulted and to participate in decision-making on climate change issues.

ii. Public consultation and participation in decision-making

The public participation principle has always been a cornerstone of international climate change law. Echoing Principle 10 of the *Rio Declaration on Environment and Development* of 1992, Article 6 of the UNFCCC mandates that Parties shall promote public access to information on climate change and public participation in addressing climate change. This was the basis for similar phrasing of operative clauses of Article 10 of the KP and Article 12 of the PA.

The right of all persons to take part in the conduct of public affairs, directly or through chosen representatives, is upheld in Article 21 of the *Universal Declaration of Human Rights* (1948), Article 25 of the *International Covenant on Civil and Political Rights* (1966), Article 3 of the [Paris] *Protocol 1 to the European Convention for the Protection of Human Rights and Fundamental Freedoms* (1954), Article 13 of the *African Charter on Human and Peoples' Rights* (1981), Article 23 of the *American Convention on Human Rights* (1969), and in the International Labour Organization's *Indigenous and Tribal Peoples Convention, 1989 (No. 169)*. The principle of public participation has been included in a number of regional environmental agreements as well, the most notable of which is the aforementioned *Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention)*, which requires signatory states to confer on the public the rights to receive environmental information held by public authorities and the right to participate in environmental decision-making. For domestic application, Parties to the Convention must secure public participation within a transparent and fair framework that includes reasonable time frames and a duty for government to take into account the product of public participation (Banner, 2015).

Public participation has significant social, environmental and ethical implications, including for environmental decision-making, which is widely considered as one of the key features of good governance and procedural human rights (UNHRC, 2016). Properly instituted and implemented, participatory processes can empower marginalized voices and lead to more effective and equitable outcomes (Jodoin, Duyck and Lofts, 2015). Public consultations and the ability of the public to participate in decision-making are particularly important at two stages. The first stage is during the preparation of legally-binding instruments by public authorities. This is a crucial stage where the public should be given the opportunity to understand the implications of the proposed legal changes on the rights and livelihoods of those who will be affected by them, to be able to raise concerns and make suggestions. To this end, the draft laws and regulations should be made publicly available and the public should be given the opportunity to comment directly or through representative consultative bodies. The result of the public consultation

should be taken into account as far as possible (Article 8, Aarhus Convention). The second stage is when public engagement should be sought in decision-making processes at local and national levels for the development of environmental plans, programmes and policies that may affect the public. The legal framework should contain appropriate and practical provisions to allow the public to access information and to participate during the preparation of plans and programmes (Article 7, Aarhus Convention).

Allowing members of the public to participate in reviewing a proposed legal reform, new strategy, or programme not only increases its legitimacy and buy-in, it also provides an opportunity to refine climate-related decision-making. Public feedback on matters such as adaptation, mitigation, emission trading, monitoring, and reporting, can result in identification of potential loopholes, overlaps, inconsistencies, and negative outcomes, including on human rights protection.

Effective participation in climate governance is complex however and requires raising awareness and strengthening capacities of governments, civil society and of the public at large. One of the first steps in realizing this principle under the PA is to involve civil society, the private sector, academia, non-governmental organizations, and other relevant stakeholders in the design and implementation of NDCs. Increased public engagement and open dialogue on climate change can lead to collective learning, accountability and eventually higher levels of public ownership and uptake of well-informed and progressively ambitious climate measures (Misonne, 2017). To this end, legal frameworks and institutional arrangements need to be strengthened to foster public participation. For the agriculture sector, detailed methodologies, tools and resources need to be defined in order to organize public consultations in rural communities and to enhance participation of indigenous peoples, women, farmers, and producers' organizations. This involves extra effort to ensure that channels of communications (e.g. radio) and appropriate content (e.g. local languages, layman terms, proper contextualization) reach rural and marginalized audiences, as well as to address barriers to meaningful participation (e.g. cultural norms, time, poverty, mobility, etc.) (UNFCCC, 2016b).

For example, the *Uganda National Climate Change Communication Strategy (UNCCCS) 2017-2021* was developed by the Government upon realization that there was a need for better dissemination of climate change adaptation and mitigation information throughout Uganda to motivate changes in communities' attitudes and behaviours so as to combat climate change and enhance sustainable development. The Strategy places greater urgency on climate change impacts and responses to motivate desired behaviour changes. It was also developed to improve coordination among stakeholders at all levels regarding climate change communications. It was developed under the leadership of the Ministry of Water and Environment of Uganda, in close consultation with relevant ministries and departments, agencies, local governments, civil society and private sector organizations, research institutions, the media, and development partners.

In Africa, Article 9 of the *Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa* of 2003, also known as the Maputo Protocol, explicitly extends consultation and participation rights to women, recalling that women are equal partners with men at all levels of development and implementation of state policies and development programmes. Parties to the Protocol are to take all appropriate measures to "ensure greater participation of women in the planning, management and preservation of the environment and the sustainable use of natural resources at all levels" (Article 18, 2.a).

Indigenous peoples also have the right to participate in decision-making on matters which would affect their rights. Article 18 of the *United Nations Declaration on the Rights of Indigenous Peoples* provides that

Indigenous peoples have the right to participate in decision-making in matters which would affect their rights, through representatives chosen by themselves in accordance with their own procedures, as well as to maintain and develop their own indigenous decision-making institutions.

This ties in well with the fact, as recognized by the PA itself, that climate change adaptation should be guided by the best available science and as appropriate, by traditional, indigenous and local knowledge systems

(Article 7, Para. 5). The value of indigenous and traditional knowledge for combating climate change was also explicitly recognized by the IPCC in its Fourth Assessment Report *Climate Change 2007: Synthesis Report*, which stated that

The Intergovernmental Panel on Climate Change has noted that most local communities develop adaptation practices that could and should be identified and followed in order to tailor effective adaptation and response strategies related to disaster risk reduction and climate change.

iii. The right to access justice and to seek redress

The right for all peoples, including indigenous peoples, to seek legal remedy, to challenge acts or decisions by public authorities or private actors which appear to contravene national or international environmental law (UNHRC, 2018), is also well established in international law – see in this regard Article 2 of the *International Covenant on Civil and Political Rights* (1966); Article 6 of the *European Convention on Human Rights* (1950); Article 8 of the *American Convention on Human Rights* (1969); and Article 9 of the *Aarhus Convention*. In the area of climate change, as noted in Chapter 2 of this Study, there is increasing use of litigation as a means of holding governments accountable for their climate change obligations, as well as to uphold related human rights (Grantham Research Institute, 2018). Where the general legal system provides legal recognition to the traditions, customs and juridical systems of indigenous peoples, it should also provide access to appropriate remedies in accordance with human rights law.

3.4. Concluding remarks for Chapter 3

This Chapter has examined the role of national legal frameworks in implementing international climate change goals and obligations, as well as the different legal avenues that countries can pursue in this regard.

Framework climate change legislation is instrumental in clarifying the mandates for climate action as well as for setting binding climate change goals and establishing duty bearers and rights in one coherent piece of legislation. Many countries around the world have adopted this type

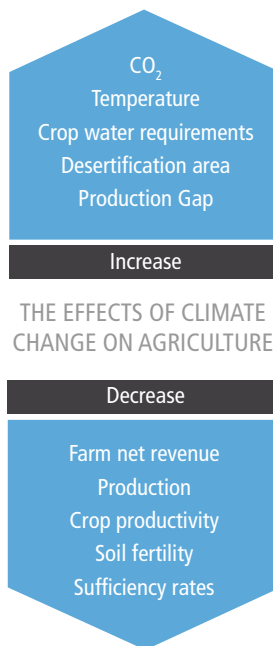
of law, with content ranging from simple to more comprehensive laws depending on the national context and nature of the legal framework. The examples provided in this Chapter can shed light into the role such laws might play, and assist to determine whether states may consider passing such laws to facilitate the implementation of their goals and obligations under the PA.

Well-designed sectoral legislation, that incorporates the cross-sectoral issues reviewed in the second part of this Chapter, will also be key in underpinning the achievement of the different legal obligations and policy goals arising from the PA and the NDCs and other related policy goals (e.g. the *2030 Agenda for Sustainable Development*). The following Chapters will look at each of the main agriculture sectors in more detail and suggest legislative areas that states can take into consideration when building an enabling legal and institutional framework for the achievement of climate change goals within those sectors and other cross-cutting sectors at national level.

Chapter 4. Legislating for climate change in the agriculture sector

The aim of this Chapter is to provide a picture of what an enabling legal framework for Climate Smart Agriculture (CSA) might comprise, outlining the areas of law related to agriculture that can serve as entry points for addressing climate challenges in this sector. The Chapter starts with an overview of the international framework and the specific obligations and guidance that countries should observe, followed by a review of relevant areas of legislation, using examples of climate-related measures and case studies.

Figure 4.1.
The effects of climate change on agriculture



4.1. The international legal framework related to agriculture and climate change

When formulating and implementing legislation to address the causes and effects of climate change in the agriculture sector, the starting point is an appraisal of relevant international legal instruments and principles that will provide the overall normative framework for proposals at the national level. The following sections of this Chapter briefly outline existing binding and non-binding instruments that cover different areas of fundamental importance for consideration.

4.1.1. The international trade legal regime

Agriculture represents a key sector for international trade and is also one of the sectors most vulnerable to climate change (WTO, 2009). Therefore, it is important that climate change and international trade policies are coherent with each other. Addressing climate change its obligations in the agriculture sector may involve the adoption of price-based measures such as taxes and tariffs, market-based mechanisms, as well as a variety of other measures including subsidies. For example, subsidies could be given for the practice of minimum tillage or the co-generation of on-farm bioenergy. Conservation payments could incorporate incentives for carbon sequestration. Although certain subsidies could be challenged by foreign competitors under the rules and procedures of the World Trade Organization (WTO), they would appear to be consistent with trade rules if they are part of a comprehensive environmental programme.

The design of agricultural subsidies would require careful consideration of their potential impact on trade rules established under the WTO and on its members' rights and obligations thereunder. The international legal framework is thus important when considering the scope of national climate policies, laws and regulations aimed at addressing climate change and agricultural sector issues, for instance, in order to avoid a climate change policy measure being deemed as a non-tariff barrier to trade and therefore being targeted by legal action under the WTO dispute settlement mechanism.

In particular, WTO rules and jurisprudence (including panel disputes within the Dispute Settlement Mechanism) that relate to environmental issues are also relevant for the examination of climate change measures – see for example the *General Agreement on Tariffs and Trade (GATT)* – *Article XX exceptions*. The WTO rules do allow for some degree of trade restrictions for the achievement of a certain policy objective, provided that some requirements are met. Here is a list of some of the relevant WTO rules and agreements that should be considered by national law/policy-makers:

- disciplines on tariffs (border measures), which prohibit members from collecting tariffs at levels greater than those provided for in their WTO scheduled consolidation;
- the general prohibition against border quotas;
- the general non-discrimination principle, consisting of the principles of the ‘most-favoured-nation’ and ‘national treatment’;
- the rules on exception under Article XX, including “measures necessary to protect human, animal and plant life or health” (Article XX(b), GATT); and “measures relating to the conservation of exhaustible natural resources” (Article XX(g), GATT);
- the *Agreement on Subsidies and Countervailing Measures (SCM Agreement)* addresses two separate but closely related topics, namely multilateral disciplines regulating the provision of subsidies and the use of countervailing measures to offset injury caused by subsidized imports (WTO, 2020). Incentives that have a positive impact on production and are not allowed under the *Agreement on Agriculture (AoA)* ‘Green Box’, are actionable under the SCM Agreement. Several carbon farming methodologies for example can have production-enhancing co-benefits and would therefore fall under the SCM Agreement (WTO, 2009);
- the AoA is specifically concerned with measures affecting trade in the agriculture sector. It establishes a number of generally applicable rules in three main policy areas: i) export subsidies (Article 8); ii) market access (Article 4); and iii) domestic

support (Article 6). It also establishes a three-tier classification of subsidies according to their consequences on production and trade: i) amber (to be reduced); ii) blue (production-limiting programmes that still distort trade); and iii) green (permitted) (WTO, 2002). Hence, CSA policies are likely to have an impact on trade when they incentivize certain agricultural practices, thus favouring some domestic farmers and their products over foreign farmers and their (imported or exported) products. However, they could in principle be allowed under the 'Green Box' if the requirements of the AoA are met (Verschuuren, 2016). Paragraph 12 of the Green Box provisions states that payments under environmental programmes must be for clearly-defined as public environmental or conservation programmes and must also be limited to the extra cost of compliance or loss of income. Green Box subsidies must be, at most, minimally trade distorting, government-funded and must not involve transfers from consumers or have the effect of providing price support for producers;

- the *Technical Barriers to Trade Agreement (TBT)* aims to ensure that technical regulations, standards and conformity assessment procedures are non-discriminatory and do not create unnecessary obstacles to trade. At the same time, the TBT recognizes WTO members' right to implement measures to achieve legitimate policy objectives, such as the protection of human health and safety or protection of the environment. Technical regulations and standards must also respect the principle of non-discrimination and be based on international standards, where these exist (for details see Verschuuren, 2016);
- the *Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement)* sets out the basic rules for food safety and animal and plant health requirements, which are relevant for agricultural products.

At the same time, there are potential trade opportunities within the WTO regime that might benefit the operations of CSA. The international

community has been pursuing negotiations to eliminate trade barriers in environmental goods and services. These services can include a number of key technologies that may contribute positively to the fight against climate change, including wind and hydropower turbines, solar water heaters, tanks for the production of biogas, and landfill liners for methane collection, all of which can play a role in making agriculture more climate friendly. To date, the lack of agreement on the exact definition of what is included in 'environmental goods and services' has stalled the progress of negotiations (Sugathan, 2013). However, alternative pathways are being explored by some WTO members, including under the auspices of the Asia-Pacific Economic Cooperation (APEC) forum, as well as a group of 46 WTO members who have launched plurilateral negotiations for the establishment of a separate *Environmental Goods Agreement (EGA)*, which is still underway.

4.1.2. The Convention on Biological Diversity

The *Convention on Biological Diversity (CBD)*, adopted in 1992, is an international, legally-binding treaty that sets out three main goals for the international community: i) the conservation of biodiversity; ii) the sustainable use of biodiversity; and iii) the fair and equitable sharing of the benefits arising from the use of genetic resources. Biodiversity is understood as comprising all forms of life on Earth, including ecosystems, animals, plants, fungi, micro-organisms and genetic diversity.

As recognized by the CBD Secretariat, while agriculture contributes significantly to conservation and sustainable use of biodiversity, it is also a major driver of biodiversity loss (CBD, 2008). A rapidly growing global human population, and consequent rapidly growing world demand for food, coupled with changing production and consumption patterns, have stimulated the evolution of agriculture from traditional to modern, intensive production systems (CBD, 2008) with detrimental effects on biodiversity and the ability of ecosystem services to adapt to changing conditions, threatening food security and livelihoods. Land-use conversion for agriculture is expected to remain the largest driver of biodiversity loss, at least to 2050. Other factors that have been

responsible are overexploitation, over-intensification and extensiveness of agricultural production systems, excessive chemical and water use, nutrient loading, pollution and the introduction of alien species (CBD, 2008). In this context, national policy-makers and farmers face the double challenge of preserving biodiversity and contributing to meet the nutritional needs of a growing population.

The CBD treaty defines biodiversity as “the variability among living organisms” including “diversity within species, between species and of ecosystems” and the equitable sharing of its benefits amongst people (Article 2). The CBD requests national governments to develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations (Article 8(k)).

In 2010, the Parties to the CBD adopted the *Strategic Plan for Biodiversity 2011-2020*, a ten-year framework for action, not only for the biodiversity-related conventions, but also for the entire United Nations system and all other partners engaged in biodiversity management and policy development. The Plan consists of five strategic goals and twenty biodiversity targets (the Aichi Biodiversity Targets). Some of these targets are of particular relevance for policy making in agriculture at national level, as follows:

- Target 7: By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.
- Target 13: By 2020, the loss of genetic diversity of cultivated plants, and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

In order to implement these targets, Parties must submit *National Biodiversity Strategy and Action Plans (NBSAPs)*. Parties should also mainstream their biodiversity strategies into the planning and actions

of all those sectors whose activities can have an impact (positive or negative) on biodiversity, including agriculture. To date, a total of 191 out of 196 Parties (96 percent) have developed NBSAPs in line with Article 6 of the CBD (CBD, 2020a).

Of note, given the increasing recognition of the interrelationship between climate change and biodiversity, *Decision XI/11* at the COP11 to the CBD in 2012, reiterated the importance of integrating biodiversity into relevant climate change activities and of ensuring coherence in national implementation of the UNFCCC and the CBD. Furthermore, at the COP 13 to the CBD, a number of related decisions were adopted, in particular *Decision XIII/3 on Strategic actions to enhance the implementation of the Strategic Plan for Biodiversity 2011-2020 and the achievement of the Aichi Biodiversity Targets, including with respect to mainstreaming and the integration of biodiversity within and across sectors*, which includes a section on agriculture (Paras. 19–41), and *Decision XIII/15 on Implications of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) assessment on pollinators, pollination and food production for the work of the Convention*. Mainstreaming biodiversity in the agriculture sector is seen as both an area of high priority, due to the adverse impact of many agricultural practices on biodiversity, and of great potential, given the opportunity to promote agricultural practices that achieve co-benefits between biodiversity and agriculture. For instance, agricultural biodiversity can provide smallholder farmers with more crop options and help to buffer the effects of extreme weather events such as droughts or floods.

4.1.3. The United Nations Convention to Combat Desertification

The *United Nations Convention to Combat Desertification (UNCCD)* of 1992 is the only legally-binding international agreement linking environment and development to sustainable land management. The Convention specifically targets the arid, semi-arid and dry, sub-humid areas (drylands), particularly in Africa, where some of the most vulnerable ecosystems and peoples can be found.

The UNCCD 2018-2030 Strategic Framework is a comprehensive, global commitment designed to achieve Land Degradation Neutrality in order to restore the productivity of vast expanses of degraded land, improve the livelihoods of people, and reduce the impacts of drought. The Strategy will be implemented primarily through actions at national or subregional levels, with the support of UNCCD institutions, partners and other relevant stakeholders. National Action Programmes (NAPs) to combat desertification and/or alleviate the impacts of drought are the key legal instrument for implementing the Convention. Given the importance of sustainable land management for climate change mitigation and adaptation, coordination of implementation between national actions on the NAPs and the NDCs, among other instruments, is strongly recommended.

Box 4.1

Enhancing coordination for national level implementation

The Rio Conventions – the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD).

The Secretariats of the three Rio Conventions established the Joint Liaison Group in August 2001 to enhance coordination amongst the three Conventions. One of the leading goals of the Group is to highlight the contribution of sustainable land management and ecosystem restoration efforts towards climate change adaptation. At the national level, countries are encouraged to improve synergies across the Rio Conventions by promoting an ecosystem approach to all policies, plans and programmes designed to implement the three Conventions, i.e. National Biodiversity Strategy and Action Plans for the CBD, National Adaptation Programmes of Action and nationally determined contributions for the UNFCCC, and National Action Programmes for the UNCCD.

4.1.4. The International Treaty on Plant Genetic Resources for Food and Agriculture and the International Convention for the Protection of New Varieties of Plants

The *International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)*, adopted by the Thirty-First Session of the FAO Conference on 3 November 2001, recognizes the vast contribution of farmers to the diversity of crops that feed the world. It establishes a global system to provide farmers, plant breeders and scientists with access to plant genetic materials, and ensures that recipients share benefits they derive from the use of these genetic materials with the countries where they originated. To this end, the Treaty introduced the Multilateral System, which puts 64 of the most important crops – that collectively account for 80 percent of the food deriving from plants – into a global pool of genetic resources. This pool is freely available to potential users within the Treaty’s ratifying nations for research, breeding and training for food and agriculture. The Treaty provides several mechanisms for facilitating access to the genetic diversity needed to enable climate change adaptation and to enable benefit sharing directed to address global challenges like climate change. These are:

- provisions on farmers’ rights, aimed at supporting farmers and local and indigenous peoples to conserve crop diversity on their farms;
- the Multilateral System, which facilitates access to a global gene pool of crop genetic resources for research and breeding of new varieties that may achieve higher yields, nutritional values and are climate resilient;
- the Leading the Field initiative and its Benefit-sharing Fund that support initiatives for the conservation and the sustainable use of crop diversity in developing countries, with a focus on helping to ensure sustainable food security by assisting farmers to adapt to climate change.

Another relevant framework is that of the International Union for the Protection of New Varieties of Plants (UPOV), which is an organization established by the *International Convention for the Protection of New*

Varieties of Plants (UPOV Convention), adopted in 1961 and revised thereafter. Both the ITPGRFA and the UPOV Convention aim to support plant breeding activities and to encourage the development of new varieties of plants. While the ITPGRFA aims to facilitate access to plant genetic resources, the UPOV Convention establishes a system for plant variety protection. When implemented by UPOV members, the relevant legal frameworks addressing these matters should be compatible and mutually supportive (UPOV, 2016).

4.1.5. Conventions on chemical management

The role of chemicals in climate change is explained in the *Global Chemicals Outlook II – Synthesis Report*, presented at the Fourth Session of the UN Environment Assembly (UNEA-4). The Report highlights that chemicals (persistent and accumulative) are lowering the resilience of soils due to the killing of organisms. There is more carbon residing in soil, mostly as organic matter, than in the atmosphere and all plant life combined. Soils weakened by use of chemicals are unable to effectively sequester carbon and thus they will release additional GHGs into the atmosphere. Their potential for providing the ecosystem services required for sustainable soil management is also jeopardized. This means adaptation and mitigation actions involving soils and land use management will have decreased impacts. Weak soils also affect food/economic security (UNEP, 2019b).

On the other hand, the intensification and expansion of agricultural production areas and global warming is likely to lead to an increase in the use of pesticides (FAO, 2016e).

Several multilateral environmental agreements, such as the BRS Conventions, address the impact and consequences of chemical and pesticide use. The BRS Conventions are:

- i. *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*;
- ii. *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*;

iii. *Stockholm Convention on Persistent Organic Pollutants.*

These Conventions share the objective of protecting human health and the environment from hazardous chemicals (including pesticides) and wastes.¹⁰ As such, they play an important role in improving the management of these substances and minimizing the risks associated with them, including contamination of land and soils (FAO, 2016e). These factors are relevant when considering appropriate mitigation and adaptation actions related to agriculture.

4.1.6. Non legally-binding international instruments

The Sustainable Development Goals

The Sustainable Development Goals (SDGs) represent the overarching international roadmap for achieving the multiple facets of sustainable development. Already in 2012, the Rio+20 outcome document of the UN Conference on Sustainable Development, entitled *The Future We Want*, explicitly recognized climate change priorities, including the

necessity to promote, enhance and support more sustainable agriculture, including crops, livestock, forestry, fisheries and aquaculture, that improves food security, eradicates hunger, and is economically viable, while conserving land, water, plant and animal genetic resources, biodiversity and ecosystems, and enhancing resilience to climate change and natural disasters; the need “to enhance sustainable livestock production systems, including through improving pasture land and irrigation schemes in line with national policies, legislation, rules and regulations, enhanced sustainable water management systems, and efforts to eradicate and prevent the spread of animal diseases”, and “the economic and social significance of good land management, including soil, particularly its contribution to economic growth, biodiversity, sustainable agriculture and food security, eradicating poverty, women’s empowerment, addressing climate change and improving water availability (UN, 2012).

Evolving from the outcome of the Rio Conference, several of the SDGs adopted in 2015 include targets that are related to climate change and

¹⁰ For more information on the collaboration between these Conventions, refer to <http://www.brsmeas.org/Home/tabid/813/language/en-US/Default.aspx>.

agriculture, as summarized here:

- SDG 2.3: By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.
- SDG 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.
- SDG 2.5: By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge.
- SDG 6.6: By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.
- SDG 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.
- SDG 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.
- SDG 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems

and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

- SDG 15.3: By 2030, combat desertification, restore degraded land and soil.

The food and agriculture sectors are key to achieving the entire set of SDGs and, in this regard, FAO focuses its attention on “rural development and investment in agriculture – crops, livestock, forestry, fisheries and aquaculture” to support their achievement by the global community. FAO also promotes interventions in agriculture to combat climate change. Therefore, in formulating climate related legislation and in its implementation, considering the policy frameworks and targets provided by the SDGs (including related plans and strategies e.g. National Development Strategies) should be a necessary part of the process (FAO, 2018b).

The Voluntary Guidelines for Responsible Governance of Tenure of Land, Fisheries and Forestry in the Context of National Food Security

How people, communities and others gain access to and control over land, fisheries and forests is defined and regulated by societies through systems of tenure. The governance of tenure is a crucial element in determining if and how people, communities and others are able to acquire rights and associated duties, to use and control land, fisheries and forests. The 2012 *Voluntary Guidelines for Responsible Governance of Tenure of Land, Fisheries and Forestry in the Context of National Food Security (VGGT)*, are the key international instrument addressing tenure of land and natural resources. Although a soft-law instrument, the VGGT are the result of a comprehensive process of international negotiation, and are based on several pre-existing legally recognized rights, such as tenure-related human rights.

In this regard, the VGGT provide an authoritative point of reference for countries when they are adopting, amending or implementing national policies and legislation on land and natural resources tenure (FAO, 2016d).

The VGGT contain substantive guidance to states on legal, institutional and policy frameworks for securing tenure rights and promoting sustainable land management (SLM), which include:

- establishing and maintaining policies, legal and institutional frameworks that promote responsible and integrated governance of land tenure, fisheries and forestry resources;
- ensuring that these frameworks are consistent with existing obligations as well as (voluntary and binding) commitments at national, regional and international levels;
- recognizing and respecting, in accordance with national laws, all legitimate tenure rights and their holders, including customary rights; this includes, therefore, departing from a notion of statutory legitimacy to include also socially legitimate tenure rights: landholders with a registered title, customary landholders and communal tenure rights, indigenous peoples, pastoralists, etc.; states should also facilitate, promote and protect the exercise of these rights, and provide access to justice and dispute resolution mechanisms in cases of their infringement;
- implementing the above objectives in a non-discriminatory way, and promoting social and gender equity; in particular, specific obstacles faced by women and girls with regard to ownership and associated tenure rights should be taken into account to ensure the protection and realization of their rights;
- developing relevant policies, laws and procedures through participatory processes involving all affected parties. Promoting transparency, rule of law, and access to information;
- assigning responsibilities to levels of government that can more effectively serve the population by clearly defining the roles and responsibilities of agencies dealing with tenure of land, fisheries and forests, and ensuring that there is coordination among agencies, local governments, indigenous peoples and other communities with customary tenure systems.

The Voluntary Guidelines for Sustainable Soil Management

The *Voluntary Guidelines for Sustainable Soil Management (VGSSM)* provide general technical and policy recommendations on sustainable soil management (SSM), based on generally accepted, practically proven and scientifically based principles. The objective is to promote SSM and to provide guidance to all stakeholders on how to translate these principles into practice, be it for farming, pastoralism, forestry or more general natural resources management. The successful implementation of these guidelines should pave the way to boosting soil health, which has important benefits, such as carbon sequestration, as well as support for adaptation.

Likewise, the *World Soil Charter (WSC)* of 1981 (revised in 2015), addresses soil as an essential natural resource and highlights principles and guidelines for action in the fight against soil degradation and in the interest of soil conservation. Important provisions related to legal, institutional elements and policy principles are cited in the WSC, as follows:

- promotion of sustainable soil management that is relevant to the range of soils present and the needs of the country;
- creation of socio-economic and institutional conditions favourable to sustainable soil management by removal of obstacles. Ways and means should be pursued to overcome obstacles to the adoption of sustainable soil management associated with land tenure, the rights of users, access to financial services and educational programmes;
- incorporation of the principles and practices of sustainable soil management into policy guidance and legislation at all levels of government, ideally leading to the development of a national soil policy;
- explicit consideration of the role of soil management practices in planning for adaptation to, and mitigation of, climate change and maintaining biodiversity;

- developing a national institutional framework for monitoring implementation of sustainable soil management and the overall state of soil resources.

In further support, FAO issued an *International Code of Conduct for the Use and Management of Fertilizers* in 2019. The Code promotes practices to improve soil health, including nutrient recycling and agronomic and land management. It recommends regulations related to the sale, distribution and labelling of fertilizer products wherever appropriate. It also promotes capacity development and education programs for all stakeholders involved in the fertilizer value chain and encourages developed countries to assist other countries to build infrastructures and capacity to manage fertilizers throughout their life cycle (FAO, 2019). As such, the Code is designed to support the implementation of the VGSSM and to assist countries to address the multiple and complex issues related to the responsible use and management of fertilizers in agriculture, from farm to national level.

Additionally, the guidance series on the development of sustainable soil management legislation under the title *International Yearbook of Soil Law and Policy*, can provide useful guidance (Ginzky *et al.*, 2017).

The International Code of Conduct on Pesticide Management

The *International Code of Conduct on Pesticide Management* developed by FAO, provides guidance on all facets of pesticide distribution and use. The Code can be used in combination with other instruments that are important for the identification of pesticides or chemicals that pose a danger to human health and the environment, including the Rotterdam, Stockholm, and Basel Conventions, the Codex Alimentarius standards for maximum residue limits and the Globally Harmonized System of Classification and Labelling of Chemicals (FAO, 2007). Article 6 of the Code sets forth specific norms and guidance relating to the establishment of a national regulatory system on pesticides, which are critical elements for the sustainability of agriculture. Among others, it provides that governments should introduce the necessary legislation to regulate pesticides, as well as provide for effective enforcement of such legislation, taking into account local conditions.

Guidance from the World Organisation for Animal Health

The World Organisation for Animal Health (OIE) is the intergovernmental organization responsible for improving animal health worldwide. The OIE has warned that climate change will have an impact on the emergence and re-emergence of animal diseases, and its mandate is accordingly to use its scientific capabilities and networks to advocate new action at the level of research, national capacity building for public and private sector animal health systems, and communication, with the aim of preventing or reducing the effects of climate change on animal production and diseases, including those transmissible to humans. The OIE develops normative documents relating to rules that Member Countries can use to protect themselves from the introduction of diseases and pathogens, without setting up unjustified sanitary barriers. It publishes standard-setting documents including: the *Terrestrial Animal Health Code* and the *Aquatic Animal Health Code*, which respectively aim to assure the sanitary safety of international trade in terrestrial animals and aquatic animals and their products. These standards have become the principal reference for the WTO and its members.

As mentioned in the preceding sections, there are various international obligations and guidance which must be kept in mind when introducing laws and policies on food and agriculture at the national level. Some of the provisions are sector-specific, others more general, and their applicability will depend on the subject matter in question and on the respective membership by each country to the treaty or instrument in question.

4.2. Creating an enabling legal and institutional framework for integrating climate change goals in the agriculture sector

The significance of the effects of climate change on agricultural systems, along with the negative contribution of conventional agricultural practices to global warming, create a compelling need to ensure integration of climate concerns into national agricultural planning, policies and programmes. The possible approaches for achieving such

integration are manifold and often context specific. Here we present some existing guidance on measures aimed at both mitigating the contribution of agriculture to global warming and at adapting to its effects on agriculture.

For mitigation efforts, a series of recommended agricultural practices for various sectors are contained in an FAO study, *Climate Change Adaptation and Mitigation in the Food and Agriculture Sector*, as follows:

- Cropland measures
 - soil management practices that reduce fertilizer use and increase crop diversification;
 - promotion of legumes in crop rotation;
 - increasing biodiversity, the availability of quality seeds and integrated crop/livestock systems;
 - promotion of low energy production systems;
 - improving the control of wildfires and avoiding burning of crop residues;
 - promoting efficient energy use by commercial agriculture and agro-industries.
- Soil carbon sequestration

This is considered one of the most promising options with a wide range of synergies: by increasing carbon concentrations in the soil through better management practices, there are benefits for biodiversity, soil fertility and productivity, soil water storage capacity, prevention of erosion and desertification.
- Livestock management
 - improving livestock waste management;
 - improving ruminant livestock management through improved feed and diets;
 - nutrients and increased feed digestibility, improving animal genetics, and increasing reproduction efficiency;

- improving regulatory mechanisms to control the number and density of animals (or merely regulating the number of animals per production unit).

(FAO, 2008a).

For adaptation efforts, some of the most effective approaches, as highlighted by the UNFCCC, are those that address a combination of environmental stresses and factors. Strategies, policies and programmes that are most likely to succeed will be those that are linked to efforts aimed at alleviating poverty, enhancing food security, combating land degradation and soil erosion, reducing loss of biodiversity, improving ecosystem services, and improving adaptive capacity within the framework of sustainable development (UNFCCC, 2014).

As noted, adaptation to climate change cannot, especially in the agriculture sector, be seen in isolation from efforts to reduce GHG emissions from agriculture, as both these efforts and their consequences can be intertwined, in both a positive and a negative fashion. For example, increased soil carbon sequestration helps mitigation and adaptation at the same time; increased natural vegetation on farmland can increase carbon uptake (mitigation) while at the same time render land more resilient to extreme weather impacts (UNFCCC, 2014). On the other hand, adaptation measures, if not properly designed, can also potentially lead to an increase in GHG emissions, or to a reduction of carbon uptake. For example, afforestation in arid and semi-arid regions (as mitigation), can reduce water yields and thus could have a negative impact on local agriculture and biodiversity (and food security); recourse to hydropower may reduce irrigation options for farmers (negative for adaptation) (UNFCCC, 2014).

Adaptation and mitigation policies relating to agriculture will also need to factor in policy goals of food security and poverty reduction in the face of climate change, also prevalent goals of the 2030 Agenda. The types of measures that can support the achievement of these objectives will necessarily be influenced by the characteristics of the local natural environment and climate patterns. For example, shifting to

different crop types will depend on the climate, i.e. whether they need to be suited to a wetter, drier, or warmer climate, or to an environment of increasing salinity (Verschuuren, 2013). It is important to design adaptation and mitigation policies in agriculture in a coordinated and coherent manner, in order to avoid negative effects on the public policy goals mentioned on food security and poverty reduction, as well as to ensure synergies and mutual benefits as much as possible.

4.2.1. Climate Smart Agriculture

The term Climate Smart Agriculture (CSA) was first coined in 2010 at the First Global Conference on Agriculture, Food Security and Climate Change in The Hague. It represents a holistic approach to tackling climate change in the agriculture sector and, in its fullest practical expression, comprises the tensions between maximizing global agricultural productivity, increasing the resilience of agricultural systems, and minimizing GHG emissions from agriculture. The concept is now widespread and is often cited as a goal in countries' public agricultural policy pronouncements. The definition of CSA used by FAO, and the most commonly used one, is "agriculture that sustainably increases productivity, enhances resilience (adaptation), reduces/removes GHGs (mitigation) where possible, and enhances achievement of national food security and development goals." The CSA concept

aims to enhance the capacity of agricultural systems to support food security, incorporating the need for adaptation and the potential for mitigation of climate change into sustainable agriculture development strategies. CSA proposes more integrated approaches to the closely linked challenges of food security, development and climate change adaptation/mitigation, to enable countries to identify options with maximum benefits and those where trade-offs need management. CSA recognizes that the implementation of options will be shaped by specific country contexts and capacities, as well as enabled by access to better information, aligned policies, coordinated institutional arrangements and flexible incentives and financing mechanisms. The concept of CSA is evolving and there is no one-size-fits-all blueprint for how it might be pursued (FAO, 2020a).

The concept of CSA aims to re-shape agricultural policy goals to include food security, development and climate change adaptation and mitigation (CCAM), which are seen as three interlinked pillars necessary for achieving this goal:

- With CSA, incomes from crops, livestock and fisheries are poised to increase without negative impacts on the environment, with beneficial effects for food and nutritional security. A key concept related to raising productivity is sustainable intensification of agriculture.
- With CSA, resilience is strengthened by building capacity to adapt and prosper in the face of shocks and longer-term stresses, and the exposure of farmers to short-term risks is decreased. Particular attention is given to protecting the services ecosystems provide to farmers and others, which are essential for maintaining productivity and the ability to adapt to climate change.
- With CSA, GHG emissions can be reduced or even removed. This implies reducing emissions for each calorie or kilo of food, fibre and fuel produced, avoiding deforestation from agriculture, and managing soils and trees in ways that maximize their carbon sink potential.

Therefore, unlike a more traditional approach to agriculture that focuses on increased production as its main goal, the CSA concept promotes a systematic integration of food security and nutrition (FSN)/CCAM into the planning and development of agricultural systems. This is of course challenging to achieve in practice and trade-offs will likely become necessary, requiring appropriate frameworks that allow for decision-making based on sound information and participatory approaches (CCAFS, 2020). For the purposes of this Study, the CSA concept and terminology will be referred to as a guiding approach and goal for integrating CCAM and agriculture.

4.2.2. Legislating for Climate Smart Agriculture

To date, there is no binding definition or internationally-binding instrument related to CSA *per se*, or one that provides agriculture with an overarching framework. The vast array of possible approaches outlined in the preceding sections, and the fact that agriculture related laws are also very diverse and context specific represents a challenge to those who strive to provide uniform and globally-applicable legal guidance in this regard. Most countries worldwide have specific national laws, regulations and policies in the agriculture sector, although their form, scope and impact varies considerably depending on geographical, socio-economic factors and political histories. Such laws will typically regulate the multiple facets of the farming and land sectors, such as the institutional frameworks, crop and livestock production, plant and animal health, agriculture processing and industry, farming rights, tenure rights (e.g. over farmland and natural resources) and arrangement of the tenancy system, agricultural infrastructure, agricultural investment, finance, credit and economic incentives, research, intellectual property, and trade. Broader land laws also determine how the sector is regulated, for example, rules on land use planning, land tenure, land management and administration, and likewise broader regulations with environmental laws, including environmental framework laws, specific laws on conversion from forestry to other land uses (but also from farmland to urban or peri-urban settings), pollution control, waste management, etc.

Climate change however is rarely addressed in agriculture related laws. In fact, a 2016 study by the Grantham Research Institute indicated that “there are more than twice as many energy-related acts as agriculture-related acts, even though the two make up similar amounts of global greenhouse gas emission.” The Study illustrated that only 181 legislative and executive Acts in the research undertaken were found to address emissions from agriculture, including those related to LULUCF (Grantham Research Institute, 2016). Given that legal frameworks play a central role in the achievement of these policy goals related to climate and agriculture, this represents a legislative gap that countries will need to address.

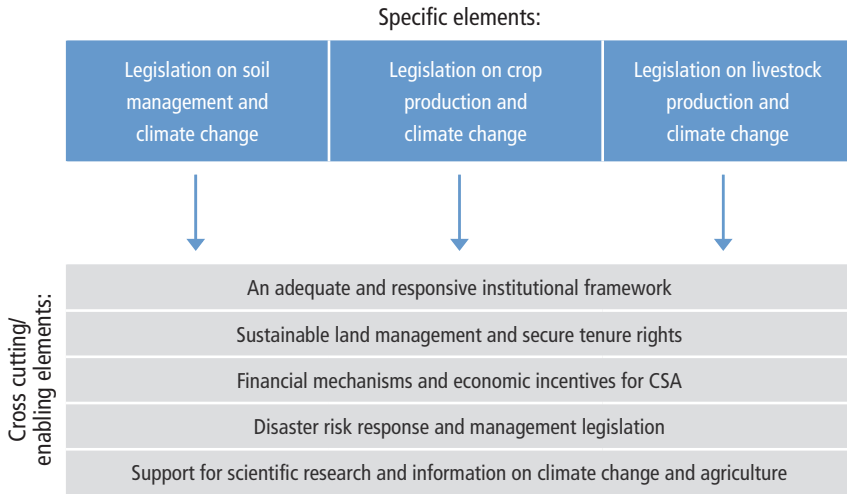
As a starting point, we can refer to FAO's *Climate Smart Agriculture Sourcebook*, which highlights areas of law and policy that can be designed or reformed to create a more enabling environment for CSA, as follows:

- CSA needs to be mainstreamed into core government policies and programmes, including policy, expenditure and planning frameworks.
- CSA requires coordination between concerned agencies across different sectors at central and local levels.
- CSA requires financing and incentive mechanisms that help to cover the costs of adopting differentiated practices in agriculture, such as payments for ecosystem or environmental services. Public support for research, the development of human capital, the sustainable management of soil and land, social protection and safety nets, and the development of technology and value chains, are all conducive to the uptake of CSA by farmers.
- The protection of land tenure rights will contribute to increased investments in sustainable land and water management, which are key elements of CSA.
- CSA approaches also require integration with disaster risk management strategies and actions.

(FAO, 2017d).

The next sections explore issues that countries should consider when introducing legislative measures for promoting CSA. Considering the interlinkages between adaptation and mitigation in the agriculture sector, these are approached concurrently and by highlighting the particular relevance of one or the other where appropriate in each of the sections. The following components will be addressed:

Figure 4.2
Elements for Climate Smart Agriculture legislation



4.2.3. The institutional framework for agriculture and climate change

Agriculture is traditionally the responsibility of a single national ministry, usually a ministry of agriculture or similar authority. However, given the relationship between agriculture and other sectors, namely land and environment (including biodiversity and forestry), food security and nutrition, the question of how best to arrange an institutional framework to address agriculture and climate change, as well as overall public policy goals, is a complex one. The first question that arises is whether there is an authority in charge of agriculture, and whether the mandate of this authority includes elements to ensure the management of agricultural land in a sustainable manner. Another question is whether the legal framework mandates the authority (e.g. line ministry or department) in charge of agriculture to take climate change considerations into account in its decisions and directives. This could be achieved by an amendment to the mandate and through the creation of a unit or office within the overall authority responsible for coordinating climate

related action for agriculture. Further responsibilities could be allocated for the development and implementation of agriculture related objectives emanating from international climate agreements (e.g. under NDCs, NAPs).

An example of a possible approach to this task is provided by the Kenyan *Climate Change Act (No. 11 of 2016)*. The Act creates a comprehensive institutional structure on climate change, including an inter-ministerial coordinating body named the Climate Change Council, which is chaired by the President of Kenya and is the national climate change coordination body. This Council ensures the mainstreaming of climate change considerations by national and county level governments and sets the targets for the regulation of GHG emissions. In addition, the Act creates a Climate Change Directorate to act as a secretariat to support the Climate Change Council and report to the Cabinet Secretary. Further, the Act mandates each state department (responsible for the different sectors of the economy) and each public entity to designate

a unit with adequate staff and financial resources to coordinate the mainstreaming of the climate change action plan and other climate change statutory functions and mandates into sectoral strategies for implementation,

as well as to put in place and implement mechanisms for sustainability in the performance of sectoral mandates.

Institutional mandates and duties may also be designed to include a requirement to take climate change into consideration in the development of agriculture policies and plans. The Republic of Korea's *Environment-friendly Agriculture Fosterage Act (1997, amended in 2011)* includes a duty for the Minister for Food, Agriculture, Forestry and Fisheries to formulate a plan, every five years, to foster environment-friendly agriculture. These plans, referred to as "fosterage plans", shall contain, among others: policy goals and basic directions for environmental preservation in the area of agriculture; measures to foster a model environment-friendly agricultural complex, and to boost the production, distribution and consumption of environment-friendly agricultural products; and measures to increase the function of agriculture to serve

public interests. This type of measure gives agriculture authorities a mandate to include climate change related goals in the management of the sector. In addition, the Kenya *Agriculture (Farm Forestry) Rules (L.N. 166/2009)* require the establishment and maintenance of farm forestry on at least 10 percent of every agricultural land holding.

Institutional coordination, both horizontal and vertical, is linked to institutional mandates. Horizontal coordination between line ministries and other offices (e.g. environment, agriculture, land, forestry and fisheries/aquaculture) is vital, as is vertical coordination, given the different impacts and adaptation needs at varying levels, requiring the involvement of authorities at different levels of governance (e.g. national, regional, local). Moreover, in recognition of the principles of public participation and access to information, it is crucial to ensure that coordination mechanisms include means for consultation/coordination with civil society groups and the private sector.

Possible avenues to achieve effective institutional coordination are described as follows (FAO, 2012):

- Designate a single existing national institution to be responsible for the coordination between all institutions involved in the implementation of the legislation. The existing scope and capacity of this institution will need to be reviewed and it should preferably already have regulatory experience over a similar range of activities covered by the legislation. The question of which ministry or agency should take the lead will depend on the circumstances in each country, but a situation where multiple eligible and competent institutions exist is likely to produce lack of clarity in mandates, and additional costs. Where a sole institution is designated as the competent authority for agriculture and climate change issues, the legal framework should set out the institutional coordination mechanisms in order to address issues arising from overlapping areas of responsibility. One legal option for institutional coordination incorporating public participation could be to establish a multi-stakeholder advisory committee that would be tasked with making recommendations to the competent authority.

- Establishing a joint body (authority) comprised of representatives from relevant ministries, public institutions, the private sector and civil society is another option. The legislation may assign executive functions to the authority or limit its role to coordination. In any case, national legislation should provide the competent authority with adequate powers to serve its given function. The Kenyan Climate Change Council fits this description.
- Another alternative, although possibly more costly and intricate, is for legislation to establish two or more committees with different functions. For instance, one executive authority to coordinate climate change matters, and another separate consultative body to liaise with civil society and the private sector. In this scenario, legal provisions should require cooperation among governmental actors for specific circumstances.

The Mexican *Ley General de Cambio Climático* (Climate Change Law) of 2012 created a National Climate Change System, which acts as a coordinating body between the central federal government, the states, and the municipalities. Its mandate includes analysing and promoting the cross-cutting application of the policy instruments established by this Law. The System is composed of an Inter-Ministerial Commission on Climate Change, formed by heads of the secretariats and governmental agencies to coordinate actions on climate change, including the approval of the national strategy on climate change and the fulfilment of objectives and commitments under the UNFCCC and the PA. It must also solicit the opinions and proposals of civil society and the private sector. It carries out this duty through several subject-specific Working Groups, such as on mitigation policy, adaptation policy, international negotiations, reduction of emissions from deforestation and land degradation. Additionally, the Law creates a Climate Change Council, which is a permanent consultative body of the Inter-Ministerial Commission, that is in charge of pursuing policies and objectives related to climate change in the context of developing the national strategy. Its duties include promoting public participation through public consultations, creating working groups to assist the Commission, and publishing an annual activity report.

Another issue to be addressed when designing an institutional framework for agriculture and climate change is assigning data collection and reporting responsibilities to the appropriate institution. The collection of data and information regarding GHG emissions, mitigation and adaptation measures, and early warning mechanisms, along with ensuring reporting obligations pursuant to international agreements, should be part of the mandate of relevant authorities/institutions of the sector. The availability of data, including on climate risks in agriculture, is key for appropriate national planning for climate change adaptation and mitigation, as well as for designing response mechanisms to disasters and the long term impacts of climate change. The collection of data should be organized across different levels of governance and should be disaggregated by gender (given the prominent role of women in agriculture and their increased vulnerability) and include relevant information on vulnerable social groups (e.g. women, children, indigenous peoples, and local communities, based on the national context).

An example of national legislation on this topic is the Brazilian *Decree No. 9 841 — National Programme for the Agricultural Zoning of Climate Risk (ZARC) (2019)*, established under the Ministry of Agriculture, Livestock and Food Supply. The Programme aims to improve the quality and availability of information on climatic risks for agriculture in Brazil through research and monitoring of climatic risks in agriculture; the evaluation, quantification or monitoring of climatic risks in agriculture and dissemination of results; and providing information on climatic risks in agriculture to society. The Programme is being used as an instrument of agricultural policy and risk management in agriculture, which is key for the access to rural insurance. In the zoning studies, the parameters of climate, soil and cycle of crops are analysed, using a methodology validated by the Brazilian Agricultural Research Corporation (Embrapa).

To further illustrate information aspects, we refer to the Philippines' *Climate Change Act of 2009 (Republic Act No. 9 729)*, which establishes the roles of various government agencies with regard to climate change action. It mandates the Department of Environment and Natural Resources to oversee the establishment and maintenance of a climate change information management system and network, including on

climate change risks, activities and investments, in collaboration with other concerned national government agencies and institutions. The Act also requires the Philippine Information Agency to disseminate information on climate change impacts, on local vulnerabilities and risks, on applicable laws and protocols, and on adaptation and mitigation measures.

Another important feature is a land registry and cadastre.¹¹ A land registry contains the legal information relating to land ownership and title to land, whereas a land cadastre contains the geographical demarcation maps. It is an important basis for national land use planning and management to have systems that register all tenure rights in the country and provide an accurate mapping of land uses. A good illustration of this system is the Brazilian *New Forestry Code*, first passed in 1965 with successive amendments, the most recent dated February 2019. The 2012 amendment created the Rural Environmental Registry, a geo referenced information registry on rural properties, including information on property perimeters and land usage within the property (including location of protected areas, areas of restricted use and areas of agricultural production, among other types of areas specified in the Code). The Registry is a national, online public registry and the Code requires every rural property to be registered. Registration of property in the Registry allows landowners to exercise several rights envisioned in the Code, such as obtaining an authorization for clearing native vegetation, and accessing rural credit from financial institutions, among others. The Registry serves several purposes, including the integration of environmental information of rural properties for more effective management and planning in rural areas. It also serves as a tool to monitor and control deforestation in private properties.

Another example comes from Bulgaria's *Law on the Preservation of Agricultural Lands (1996, as amended in 2003)*, whose main objective is the preservation of lands from damage, as well as the restoration and improvement of the fertility of agricultural lands. Article 39 of the Law creates a Commission for agricultural lands under the Ministry of

¹¹ For further information on this topic, see: FAO, 2017e and 2017f.

Agriculture and Forests which is mandated, among others, to approve short and long-term programmes for the restoration and improvement of the productive qualities of agricultural lands. Furthermore, the Law mandates the Ministry of Agriculture and Forests to maintain an information system for agricultural soil resources that shall contain a special register of agricultural lands that are: i) polluted with heavy metals and metalloids, radio nucleoids, oil products and other organic pollutants, industrial, construction and household waste; and ii) threatened by erosion, salination, pollution, acidity and swamping. The register should also contain, among others: information about restrictions to land use and recommendations for land use regimes, and provisions on offences and prescription; industrial waste areas fit for reclamation and improvement of agricultural lands; and information on short and long-term programmes for improvement of the productive qualities of agricultural lands and their protection from erosion, pollution, salination, acidity and swamping.

4.2.4. Sustainable land management and security of tenure rights

Spatial planning, land use and management

The management of land resources involves planning the uses of land in collaboration with stakeholders. It is ideally achieved through a combination of political decisions: legal, administrative and institutional execution; demarcation on the ground; inspection and control of adherence to the decisions; solving of land tenure issues; settling of water rights; issuance of concessions for plant and animal extraction (timber, fuel wood, charcoal and peat, non-wood products, wildlife); and promotion of the role of women and other disadvantaged groups in agriculture and rural development in the area, and safeguarding the rights of indigenous peoples (FAO, 1995).

The productivity and sustainability of a land-use system is determined by the interaction between land resources, the climate and human activities. In the face of climate change and variability, ensuring the sustainable management of land resources (i.e. soils, water and biodiversity) is essential for minimizing land degradation, rehabilitating degraded land and maximizing resilience (FAO, 2020b). Furthermore, the sustainable

management of land is crucial to prevent further damage to the many natural resources associated with land, which are in turn conducive to the causes of climate change. In this regard, the concept of sustainable land management (SLM) is a key component of an enabling framework for CSA. FAO has defined SLM as follows:

the adoption of land-use systems that through appropriate management practices enable land users to maximize the economic and social benefits from the land while maintaining or enhancing the ecological support functions of the land resources (FAO, 2020b).

Agriculture expansion and poor management of forest resources (combined with land use change) are some of the greatest threats to the balance of ecosystems across the planet and contribute greatly to the causes of climate change. In the *State of the World's Forests 2016*, FAO highlighted agriculture as one of the main causes of deforestation, accounting for up to 70 percent in some areas of the world (FAO, 2016f). SLM is therefore a conceptual framework that pays due regard to both the economic and social importance of land, its relevance as a source of food security, poverty eradication, social stability, rural development, and sustainable livelihood for a large part of the world's population, along with its relevance for environmental sustainability. SLM also emphasizes the need for integrated management of natural resources including land, water and biodiversity – often referred to as the 'ecosystems approach' or 'landscape approach' (see Box 4.2). According to FAO, SLM is based on four principles, which are also aligned with the VGGT:

1. Targeted policy and institutional support, including the development of incentive mechanisms for the adoption of SLM and income generation at the local level.
2. Land-user-driven and participatory approaches.
3. The integrated use of natural resources on farms and at ecosystem scale.
4. Multi-level, multi-stakeholder involvement and partnerships at all levels – land users, technical experts and policy-makers.

(FAO, 2020b)

The practices of SLM include, *inter alia*, the prevention of further and unsustainable land conversion and protection of vulnerable lands; the prevention and mitigation of land degradation and restoration of degraded lands and soils; the control of soil erosion and the management of soil organic matter; the promotion of integrated soil–crop–water management and integrated agroforestry and agrosilvopastoral systems; and the rehabilitation and sustainable management of dryland environments – through the management of grazing and livestock, rainwater harvesting, improvement of crop–water productivity, and the management of soil salinity in irrigated dryland agriculture (FAO, 2020b). According to a UNCCD policy brief, SLM offers several co-benefits such as climate change mitigation and adaptation opportunities. Scientific evidence shows the advantages of adopting practices such as land-based solutions that have the potential to simultaneously address desertification, land degradation and drought, climate change adaptation and mitigation, and the protection of biodiversity (UNCCD, 2017).

However, the implementation of SLM depends on the existence of an appropriate framework that determines not only the overall goals, but also the conditions under which decisions can be taken to achieve them. This includes the provision of a “land use policy” (or “land policy” according to the context) that will guide the direction to be taken by the government on the main issues relating to spatial planning, including the planning of natural resources such as land, forests and fisheries. A land use policy contains objectives for the allocation of national resources over a fixed period of time, but with the flexibility for adjustment. With regard to climate change, it is important that such a policy organizes the competing uses of land, and envisions mechanisms to avoid unsustainable land use change, which can be further strengthened through duties and mandates in a legal instrument governing the land sector. When developing legislation governing land use, planning and tenure, it is important that a civic space is created to balance societal priorities in the use of land, fisheries and forests (FAO and UNEP, 1999).

Integrated land use legislation should have four main objectives:

1. Protection of the environment.

2. Ecological stability of agricultural systems.
3. Long-term satisfaction of basic needs (self-sufficiency in food and other agricultural products), i.e. food and nutrition security.
4. Economic growth and support to livelihoods at national and local level.

(FAO and UNEP, 1999)

Box 4.2 Ecosystem or landscape approach

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment, and recognizes that humans, with their cultural diversity, are an integral component of ecosystems (FAO, 2020l). The CBD describes the term as covering a diversity of approaches, including landscape approaches, many of which are very similar to those embodied in the various manifestations of the ecosystem approach, describing any spatially explicit attempt to simultaneously address conservation and development objectives (CBD, 2020b).

Access to a fair justice system allows for conflict resolution and recourse. The rights and responsibilities of different actors need to be clear to, and accepted by, all stakeholders. Clarifying rights and responsibilities is now replacing the command-and-control approach. Facilitation and negotiation are emerging as the core business of resource management agencies.

Achieving multiple objectives at the landscape level will require harmonizing and integrating sectoral policies so that different planning frameworks are aligned. So far, many policy, legal and institutional frameworks reflect a separation between ecosystem management, agricultural productivity, and forestry and rural livelihoods frameworks, which is not conducive to applying a cross-sectoral approach. Joint planning and coordinated

Box 4.2 (cont.)

interaction between ministries is important in curbing this challenge, and can be fostered through mechanisms designing cross-sectoral consultation and coordination. Core policy needs, at the local, national and international levels, include compatibility and coordination of policies for agricultural development, forests, water, climate and biodiversity conservation; environmental legislation that acknowledges the potential and the rights of farming communities; and the removal of public subsidies and incentives that harm biodiversity (FAO, 2017d).

Laws related to land (use) planning, zoning and management can also mainstream climate change considerations. To illustrate this, we refer to the United Republic of Tanzania's *Land Use Planning Act (No. 6 of 2007)*. The Act requires the land planning authority, in the exercise of its land use planning functions, to harmonize resource management sector plans and integrate them into the national land use framework plan. It also provides for the appraisal of land use patterns to determine their impact on the quality and quantity of natural resources. All local planning authorities are required, in collaboration with the National Environment Management Council, to establish requirements for protection of the environment and sustainable use of natural resources. Land use planning is expected to promote sustainable land use practices, establish a framework for the prevention of land use conflicts, ensure equity and security in access to land, and enable more productive uses of land.

Spatial planning and zoning instruments can also be used to mitigate and manage disaster risks. They can serve to identify risk areas, develop and implement mitigation strategies and may be used proactively in the design of related climate change adaptation strategies – thereby reducing the exposure of the population to natural disasters (Heermans, Ndagiza, and Knox, 2015). An example is the Philippines' *Administrative Order No. 1 of 2010 Directing the Local Government Units, Particularly Provinces, to Adopt and Use in their Planning Activities the Guidelines on*

Mainstreaming Disaster Risk Reduction (DRR) in Subnational Development and Land Use/Physical Planning. This Presidential Order demonstrates how legislation can be used to direct local planning to consider disaster risk management principles and guidelines. The preamble of this Order recognizes the country's vulnerability to natural disasters (owing to its location and geography) and the impact of the high frequency of disasters on its socio-economic development. The Order directs local government, particularly the provinces, to adopt the DRR Guidelines to enhance natural disaster risk reduction efforts in the local development planning process. The text also grants technical assistance and support to enable local administrations to effectively carry out the directive.

With regard to zoning as an instrument to support climate change planning and DRR, an example is Viet Nam's *Land Law No. 45/2013/QH13*. Article 3 defines the land master plan as comprising the distribution and zoning of land according to its use in order to serve the objectives of socio-economic development, environmental protection and climate change adaptation (amongst other factors). It mandates the consideration of climate change adaptation measures in the development of plans for land use (Article 35). Adjustments to land use plans can be made as a result of natural disasters that result in the change in land use, its purposes, structure and available surface area (Article 46).

In addition, legislation requiring environmental and or social impact assessment procedures can be instrumental to enhance the integration of land use and management with other policy goals, such as climate change. An example of this is the *European Union Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive)*. This Directive applies to a wide range of public plans and programmes and is mandatory in matters relating to agriculture, forestry, fisheries, energy, waste and water management, (town and country) planning and land use, among others. In other cases, the European Union Member States have to carry out a screening procedure to determine whether such plans/programmes are likely to have significant environmental effects, and if the conclusion is positive, an SEA is required. The SEA report and the results of the consultations have to be taken into account before a decision is made, and significant

environmental effects of the plan or programme are to be monitored. Instruments like this provide critical data on the impacts of proposed initiatives on the environment and also other key policy goals (such as climate change, e.g. whether the change of designation of a protected area will allow for activities that lead to increased emissions). In addition, such instruments are key for enhanced accountability and transparency, by promoting more informed decision-making, and publishing information that allows for accountability of public authorities.

Procedural rights are also important when it comes to spatial planning and SLM, as emphasized in the VGGT. Such rights ensure that all stakeholders are informed of the impacts of planned mitigation and adaptation actions and that they have a means to effectively contribute to these processes and to seek reparation in case of rights infringements. An illustration of this is Uruguay's *Law No. 18 308 – Norms for territorial use and sustainable development (2008)*, which establishes the instruments for planning and participation and provides guidance for land planning and use towards the attainment of national and public objectives. The Law contains a number of core guiding principles, which include the predication of decision-making on environmental sustainability, social equity and territorial cohesion; the cooperation of public entities; consultation of public and private sectors; and the promotion of public participation in the processes of preparation, implementation, monitoring, evaluation and revision of territorial planning instruments.

Security of tenure rights

Systems of land tenure determine and regulate how people, communities and other stakeholders gain access to land, fisheries and forests and resources connected thereto, such as water. Tenure systems determine who can use which resources, for how long, and under what conditions. As explained in the Preface of the VGGT, these systems may be based on written policies and laws, as well as on unwritten customs and practices. In practice, multiple types of rights can be held by different persons or groups. For example, there may be different rights to the same parcel of land which may include the right to sell, to use the land through a lease, or the right to travel across the land, and each right may be held

by a different party (FAO, 2002). Such a so-called “bundle of rights” may, for example, be shared between the owner and a tenant to create a leasing or sharecropping arrangement, thereby providing the tenant or sharecropper with the right to use the land on specified terms and conditions. Important rights deriving from this include:

- *Use*: The specific use right has implications for the types of activities resource users can undertake and the stream of benefits they can obtain as a result of their decisions.
- *Management*: Landholders need to be able to make decisions about how to use the land and resources they have rights to access and/or use (albeit respecting conditions related to specific policy goals such as environmental protection).
- *Transferability*: The ability to transfer land and/or resource rights (whether permanently through sale or temporarily through lease or other mechanisms) in a relatively transparent market, increases the likelihood that a land user will make investments or improvements to the land, because they expect to capture any increased value of the land or resource in the sales or rental price.

(FAO, 2002)

Given the complexity and variability amongst tenure rights systems, it is beyond the scope of this Chapter to provide a blueprint on how these should be addressed at national level. General guidance can nonetheless be drawn from the VGGT principles, which support the recognition and protection of all legitimate tenure rights as a key starting point. It should be noted that legitimate tenure rights do not as a concept automatically imply ownership of the resource. This remains a prerogative of government in many countries in which land, including farmland, is owned by the state (or in which the state is the custodian of land on behalf of the people) and land users are bestowed different types of tenure rights over the land they farm. On the other hand, land tenure rights should be secure and of sufficient duration to allow the user(s) to benefit from sustainably managing the land in the long run. Particular

groups of land users may require special attention, as follows:

- Smallholder farmers and local farming communities play a central role in implementing CSA practices; but in many instances, locally established user rights are not legally formalized, such as where land is state owned and used traditionally by local communities. The reality of tenure arrangements over land and other natural resources, in practice, must be taken into account for all stakeholders, in order for climate change mitigation measures to succeed.
- Pastoralists may also play an important role: rangelands, commonly used by pastoralists, cover around 24 percent of the world's terrestrial surface. If appropriately managed, these lands have great potential as carbon sinks while providing livelihoods for millions of people. Land tenure systems that include pastoralists are recognized as presenting particular challenges that should be reflected in tenure arrangements that are conducive to CSA.

(FAO, 2011a)

In whatever form, secure land tenure rights are an essential component of SLM, and crucial for the implementation of structural changes to existing farmland use practices towards the establishment of CSA. Several factors illustrate and underline the importance of tenure rights:

- Long-term soil carbon accumulation and conservation requires foresight, and tenure security is considered crucial for farmers to adopt land management practices like cultivation of perennial crops, tree planting or construction of water harvesting facilities that will yield long-term returns on investment.
- Incentive measures for CSA require identification and coordination of recipients, and ways of ensuring accountability for the mitigating actions, which require clear land tenure rights arrangements.

- Climate change mitigation programmes may cause changes in the value of the land,¹² depending on the types of activities that are implemented; where tenure rights are not secure, local farmers may have their use rights destabilized, which may lead to displacement of resource-dependent users, conflict and increased food insecurity.
- Unclear tenure arrangements may deter external investors due to the risk of conflict and lack of accountability.¹³

(FAO, 2011a)

Secure land tenure means that people in a given environment recognize and respect the land rights of others over time and that land tenure rights create incentives to either discourage bad practices or encourage the adoption of new practices, such as CSA. Therefore, strengthening these rights is of particular importance for those practices that require significant upfront investments but that have medium- to long-term payoffs (USAID, 2015). Secure tenure rights also allow farmers to use the land as collateral for credit and having such collateral facilitates the access to financial markets and increases the supply of credit available to them. In turn, access to credit enables farmers to make durable investments and to increase inputs into production systems and thereby boost agricultural productivity (USAID, 2015).

¹² For further information, see FAO, 2017g (with particular reference to Chapter 3).

¹³ For further information, see FAO, 2016g; and FAO, 2017g.

Box 4.3

The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT) on tenure related aspects of climate change action at national level

Section 23 of the VGGT states the following with respect to climate change:

- States should ensure that legitimate tenure rights to land, fisheries and forests of all individuals, communities or peoples likely to be affected, with an emphasis on farmers, small-scale food producers and vulnerable and marginalized people, are respected and protected by laws, policies, strategies and actions related to climate change.
- Where appropriate, states should strive to prepare and implement strategies and actions in consultation and with the participation of all people, women and men, who may be displaced due to climate change.
- States should facilitate the participation of all individuals, communities or peoples, with an emphasis on farmers, small-scale food producers, and vulnerable and marginalized people, who hold legitimate tenure rights, in the negotiations and implementation of mitigation and adaptation programmes.

FAO's technical guide *Responsible Governance of Tenure and the Law: a guide for lawyers and other legal service providers* (FAO, 2016d), on the legal aspects of VGGT implementation highlights the following key focus areas:

1. Recognition of all legitimate tenure rights, particularly customary tenure rights in national legislation.
2. Land restitution and redistribution processes: where countries choose to implement land redistribution reforms, national legislation should establish mechanisms to enable beneficiaries to maintain an adequate standard of living from any land, fishery or forest resources that they acquire.
3. Transparency in legislation should be promoted to support efforts to reduce corruption and mismanagement.

Box 4.3 (cont.)

4. Free, prior and informed consent of stakeholders: legislation should require that all affected populations be consulted before the State distributes tenure rights and authorizes investments, infrastructure projects or conservation efforts.¹⁴
5. Requirements for environmental and social impact assessments should be included in legislation, as well as the requirement that their results be published widely and in a clear manner.
6. Expropriation and compensation: clear and well-drafted land expropriation legislation can help reduce conflicts related to compulsory takeover by the State, and ensure that affected parties obtain a position equal to or better than their previous one.

Rules on land use can also guide and constrain the exercise of tenure rights by stakeholders such as to steer farmers' use of agricultural land in a more climate-friendly way. To illustrate, the Brazilian *Forest Code (No. 12 651/2012, as amended in 2019)*, creates a system of rules on sustainable use that constrain the freedom of landholders to use their land where native vegetation is present (including farmland). The Law defines limitations of property use and the rules governing forest clearing, according to different types of land, by determining that rural properties need to maintain: a) Permanent Preservation Areas, which are protected areas within a rural property, covered or not by native vegetation, with the role of preserving water resources, landscapes, geological stability, biodiversity, protecting soil, and safeguarding the well-being of human populations. The concept of Permanent Preservation Areas reflects the environmental function of the area and recognizes its essential ecological processes. Such Areas can be found in all areas (private or public), as their creation is a function of environmental characteristics and not of the legal status of the land. Examples of such Areas are riparian zones, springs, hilltops, steep slopes and mangroves; and b) Legal Reserves, which are

¹⁴ For further information, see FAO, 2014b.

areas within a rural property in which a portion of native vegetation must be maintained and the sustainable economic use of the property's natural resources must be pursued so as to support the conservation and rehabilitation of ecological processes, promote biodiversity conservation, and provide shelter and protection to wildlife and native flora. The size of a Legal Reserve varies according to the biome in which the property is located. For example, in the Amazon, 80 percent of the overall property, in properties located in a forest area; 35 percent in properties located in an area with *cerrado* vegetation (savannah); 20 percent in properties located in grasslands; and 20 percent in other regions. Such a mechanism is an example of a regulatory instrument that links the exercise of tenure rights to the sustainable use of land resources.

Gender equality and tenure rights: protecting women's tenure rights

Rural women represent a quarter of the world's population and around 43 percent of the agricultural labour force in developing countries. However, available indicators reveal that rural women globally fare worse than rural men and urban women, and that they experience poverty, exclusion, and the effects of climate change in a disproportionate manner. Smallholder women farmers are more exposed than men to climatic risks and for many of the same reasons that women farmers' productivity is lower than men's, they have fewer endowments and entitlements, have more limited access to information and services, and are less mobile. Furthermore, even if women play a key role in food production and household food security, rural women are extremely vulnerable when it comes to real decision-making power and rights over land and resources (FAO, 2014c). The nature and intensity of poverty and vulnerability to risks is also gender-specific. Therefore, legislation for CSA should address gender inequalities in tenure rights, access to resources, services, and employment opportunities, so that men and women can benefit equally. Gender equality is, indeed, a principle of implementation of the VGGT, and methodologies for the assessment of the SDG indicators related to gender, equality and land, have been developed by FAO (FAO, 2016c).¹⁵

¹⁵ For broader guidance on this topic, see FAO, 2013.

It should be noted that, opposed to statutory land law, which in many countries in the world guarantees equality of rights, the situation may not be the same in customary law regimes or according to traditional practices. For instance, in many cases, rural marriages are not registered, which renders the union unprotected by statutory inheritance laws. Women are often not entitled to inherit land. Furthermore, even where statutory provisions recognize the application of customary laws in so far as they are compatible with Constitutional provisions on gender equality, the *de facto* situation of inequality persists, often because people are not aware of their statutory rights and would in any event find them difficult to enforce (FAO, 2017h). These situations should be carefully considered so that women can be empowered to exercise their important role in CSA.

Liberia's *Land Commission Act of 2008* creates the said Commission which is required to make recommendations regarding the equitable access to, and security of, tenure in land for women, youth, and other categories of persons who may be disadvantaged in terms of land tenure. Kenya's *Community Land Act (No. 27 of 2016)* requires registered communities that make decisions on customary rights of occupancy to have regard to

[...] equality of all persons including- (i) equal treatment of applications for women and men; and (ii) non-discrimination of any person on the basis of gender, disability, minority, culture or marital status.

In the *Community Land Regulations (L.N. No. 279 of 2018)* issued under this Act, the land management committee is to ensure benefit sharing agreements that guarantee sustainable use of land and equitable distribution of benefits including minority groups, women and persons with disabilities.

4.2.5. Financing and incentives

Ensuring access to sufficient and adequate finance for the agriculture sector is a challenge in most countries, due to perceptions of its low profitability, low margins for financiers, high actual and perceived risks, and high transaction costs. However, in order to achieve countries' adaptation and mitigation objectives, a significant increase of capital

available for climate smart investments in agriculture is critical. Climate finance can play a catalytic role in supporting the agriculture sector to become part of the climate solution and help transform the sector to deliver inclusive and sustainable growth (World Bank, 2016).

Climate finance refers to all financial flows, regardless of origin, that help to achieve climate change adaptation and mitigation objectives. Existing sources of climate related agricultural investments are mainly national, bilateral, and multilateral, as well as dedicated climate funds such as the Global Environmental Facility (GEF) and the Green Climate Fund (GCF). These sources of public climate finance are essential to stimulate CSA investments and support the transition to lowcarbon and climate-resilient economies. However, it is estimated that only a small portion of total climate finance flows into agriculture. The total amount of climate finance invested globally in 2014 was an estimated USD 391 billion, from both public (38 percent) and private (62 percent) sources. Of the total USD 391 billion, only USD 6–8 billion was invested in agriculture, forestry, and other land use. About USD 3 billion was directed to adaptation and another USD 3 billion to mitigation (World Bank, 2016).

We present some possible mechanisms through which climate finance can be activated to support the agriculture sector:

- Designing innovative mechanisms to leverage additional sources of capital, from both public and private sources: developing public-private partnerships to leverage the resources, expertise and capacities of stakeholders; designing and piloting innovative investment vehicles that can help attract additional capital by diversifying and managing the risk return profile of each investor; and bundling a wide range of financial instruments to increase effectiveness and provide more holistic and comprehensive solutions.
- Identifying entry points to direct climate finance into agriculture and to link climate finance to smallholders and agricultural SMEs, as well as developing and/or improving the agricultural finance enabling environment: designing policy and regulatory

frameworks; creating structures to facilitate and accelerate climate smart investments; and supporting financial institutions to further develop and strengthen their risk management mechanisms, e.g. through the creation of rural credit rating agencies, promoting guarantees, insurance, value chain finance, warehouse receipts, climate smart advisory services, and big data and data science, among others.

(World Bank, 2016).

In addition to finance, the use of economic incentives for achieving environmental and social objectives and transformational changes, has gained traction over the past decades as a means to steer the transition towards more sustainable land and natural resource management (TerrAfrica, 2009). Incentives can range from payments for ecosystem services programmes, direct subsidies for adoption of certain investments and/or practices such as irrigation or SLM practices, and subsidies for inputs or participation in insurance schemes (FAO, 2018c). All these tools will have their legal and policy underpinnings, which will be context specific. An example of an incentive is the enabling of producers to obtain premium prices for products that are produced in environmentally sustainable ways.

Mexico's *Ley General de Cambio Climático (2012, amended in 2016)*, mandates the Federal Government, the States, and the Federal District, within their respective authorities, to design, develop, and apply economic instruments that provide incentives for meeting the objectives of national climate change policy. The Law defines economic instruments as including the regulatory and administrative mechanisms of a fiscal, financial, or market-based nature by which a person assumes the benefits and costs related to climate change mitigation and adaptation and has incentives to carry out actions that contribute to the objectives of national policy in this area.

Payments for ecosystem services

Payment for Ecosystem Services (PES) involves payments to landowners or other natural resource owners in return for a guaranteed flow

of ecosystem services or certain actions likely to enhance their provision over-and-above what would otherwise be provided in the absence of payment. The PES incentive has been gaining support as a promising tool for the promotion of CSA practices, in particular in small-scale farming contexts with low incomes (Engel and Muller, 2016). Programmes with PES tend to focus on areas such as forestry (avoiding deforestation, afforestation, or recovering from forest degradation) or also water management. The incentive, when linked to agriculture support programmes, can also promote win-win relationships between sustainable production (as a goal of CSA) and forest conservation. For instance, research undertaken in Zambia suggests that potential PES recipients value in-kind agricultural inputs more highly than cash payments (even when the monetary value of the inputs is lower than the cash payment), highlighting that PES could potentially succeed in conserving forests and intensifying smallholder agriculture (Vorlaufer *et al.*, 2017).

The form and approach for PES varies, but can generally be differentiated according to the geographical scale (local, regional and global), the structure of the compensation (direct or indirect, public or private), the type of ecosystem they protect (forests, wetlands, etc.), or the types of services the payment is provided for. In contrast to the “polluter pays principle”, PES follows the “beneficiary pays principle”, and compensates individuals or communities whose land use (or other activities) influence in a positive manner the provision of ecosystem services. Participants can be individual landowners, farmers, communities, businesses or public entities. However, because most ecosystem services are not traded in markets, the intervention of a regulatory agency may likely be required, to create those markets. Payments may be made either directly by the (private) beneficiaries of the services, or indirectly through a public authority, and should ideally be subject to the evidence of the provision of the ecosystem service (output-based payments). Often, PES are found in water and carbon sequestration initiatives (carbon markets are profiled as a separate solution). In its broadest definition, PES can also comprise ecological fiscal transfers, biodiversity offsets and payments for agricultural conservation easements, which are based on a voluntary

agreement between landowners and government, industry or NGO, transferring the existing development rights of properties. The type and extent of future development is then limited on the property. Purchased development rights can be traded in a market for offsetting, etc. (FAO, 2020c).

An enabling legal framework is the first requirement to introduce a PES scheme. Buyers must be identified, the market conditions understood and the service provider legally recognized. The service provided needs to be priced and data and information systems should be developed so as to be able to economically evaluate ecosystem services. Regulations are needed on the scope of the PES and on definitions of terminology (e.g. 'ecological' vs. 'environmental' services); financing sources (taxes, etc.); mandates and authority of institutional authorities; contractual elements; safeguards for benefit-sharing; security of land tenure rights and spatial planning; compliance and enforcement issues; monitoring and verification; and conflict resolution (IUCN, 2010).

In addition to these enabling legal elements, studies undertaken on the PES frameworks of several countries in Latin America where this instrument is relatively well developed, have indicated some key issues that need to be resolved in the legal sphere:

- The role of the state as regulator or mediator in the PES market: even when the mechanism creates a PES scheme among private parties, the state will still have a role to play in the creation of an adequate environment for PES transactions (e.g. guaranteeing the security of land tenure, defining institutional mandates and of the scope of PES, and which type of environmental services can be contemplated for the scheme).
- Clarification of land tenure rights of those who participate in PES transactions: it is noted that full property rights should not be a necessary requirement, as in many countries this is not feasible, and other types of rights such as legitimate possession and usufruct rights might be considered.

- Clarity in the legal definition and legal nature of:
 - ecosystem;
 - environmental service (the service as a legal asset transferable through the PES agreements); and
 - payment or compensation for environmental services.
- The institutional framework: which should take into account the intersectoral nature of the PES and the fact that environmental services can be provided by different types of ecosystems and not only by forests and watersheds. In this sense, the institutional schemes can count on the participation of agencies of the environmental and agricultural sectors, including the mining and transport sectors. Such a framework should define the competencies of who will be in charge of the PES programmes from local to national level. The state must measure its levels of intervention to avoid high levels of administrative centralization that entail high transaction costs.
- Institutional capacity: in terms of skills of management and intersectoral negotiation leading to better coordination of agendas and collaboration between the sectors.

(OAS, 2009)

An example of a project based PES in the agriculture sector that also targets climate change, is a joint initiative of the Swedish Cooperative Centre and the Vi Agroforestry Programme in the Karawage district of the United Republic of Tanzania. This PES scheme remunerates small-scale farmers for carbon sequestration obtained through agroforestry, and sells the carbon offsets in a voluntary carbon market. The PES agreement requires improved soil management and agroforestry systems and also requires farmers to develop personal management plans, including boundary planting, woodlots, fruit orchards and dispersed inter-planting (FAO, 2011b).

An example of legislation for PES comes from the Brazilian State of Espirito Santo, which adopted *Law No. 8 960 establishing a State Water*

Resources Fund (FUNDÁGUA) in July 2008, establishing a State Water Resources Fund (Fundágua), later reformulated in 2012. This Fund collects money from different sources, including petroleum royalties, water fees or fines, which can then be invested into PES that reward rural property owners for the expansion, conservation and/or preservation of forest cover and adequate soil management (FAO, 2011b).

Carbon pricing mechanisms and agriculture

Mechanisms to ‘put a price on carbon’ have been gaining support over the past years as they represent a promising climate policy approach for mitigating GHG emissions and increasing low carbon investments. Carbon pricing aims to capture the externalities (e.g. the unaccounted environmental costs) of carbon emissions and tie them to their sources through a price on carbon. There are two main types of carbon pricing instruments (World Bank Group, 2019):

- Emissions trading system (ETS): also referred to as a cap-and-trade system – sets an overall cap on the total level of GHG emissions and allows industries with low emissions to sell extra allowances to larger emitters. By creating supply and demand for emissions allowances, an ETS establishes a market price for GHG. The cap helps ensure that the required emission reductions will take place to keep the emitters (in aggregate) within their pre-allocated carbon budget.
- A carbon tax directly sets a price on carbon by defining a tax rate on GHG or, more commonly, on the carbon content of fossil fuels or other sources of emissions. The *Carbon Tax Act (Act. No. 15 of 2019)* of South Africa, which covers carbon emissions from the AFOLU sectors, is an example of this. A carbon tax is different from an ETS, in that the emission reduction outcome of a carbon tax is not pre-defined but the carbon price is.

The choice of instrument will depend on national economic circumstances. Well-known examples of ETS around the world, chiefly the one created by the European Union, have revealed some challenges for the inclusion of agriculture in such mechanisms. However, some

reflections on possible legal avenues that countries can pursue to tackle agriculture through carbon pricing are explored throughout the rest of this section.

Inclusion of agriculture in Emissions Trading Systems

Emissions Trading Systems (ETSs) are the most common policy instrument used to reduce GHG emissions (Mehling, Asselt and Kehler Siebert, 2015). ETS are being used in the European Union, as well as in parts of the United States of America, in the Canadian provinces of Quebec, Ontario and Alberta, seven regions in China, the Republic of Korea, Kazakhstan, New Zealand, and the Japanese cities of Saitama and Tokyo. However, the inclusion of farming activities in an ETS is considered problematic because of the difficulty of measuring their emissions and their reduction levels at the farm level. Indeed, while non-CO₂ emissions from livestock and the use of fertilizers can fairly easily be estimated at the national level by using uniform emission factors, thereby being assessed and regulated at a sector-wide level, farm-level emissions are much more difficult to measure because of the variety of factors involved (the diet of animals, tillage intensity, soil composition, regional weather systems, fertilizer application methods, etc.). Furthermore, CO₂ emissions from agriculture are considered even harder to estimate (Verschuuren, 2017a).

Despite these difficulties, a few countries have been experimenting with this type of instrument, as outlined in the following pages.

Australia: Carbon Credits (Carbon Farming Initiative) Act 2011

Australia is considered to be the country with the most far-reaching legislation aimed at integrating agriculture into an ETS (Verschuuren, 2017a). The *Carbon Credits (Carbon Farming Initiative Act (or CFI Act) of 2011*, complemented by the *Carbon Credits (Carbon Farming Initiative) Rule (CFI Rule) of 2015*, was designed to protect the environment by encouraging sustainable farming and providing a source of funding for landscape restoration projects, allowing farmers and land managers to earn carbon credits in two ways: i) by storing carbon in soil or plants (sequestration projects); or ii) by reducing GHG emissions (emission

reduction or avoidance projects). To be eligible, projects must present value added by delivering supplementary GHG emission reductions (“additionality”), based on three requirements: newness, regulatory additionality and a government programme requirement. The CFI includes a list of eligible activities (the “positive list”) that are not common practice and deliver additional abatement, whereas a “negative list” sets out the types of activities that are not eligible under the CFI, due to their potential negative impacts on land access for agricultural production, the availability of water, conservation of biodiversity, employment, and on the local community. Projects are only eligible when covered by an approved methodology. Methodologies are regularly updated; for the agriculture sector, the following methodologies have been established:

- Beef cattle herd management;
- Destruction of methane from piggeries using engineered biodigesters;
- Destruction of methane generated from dairy manure in covered anaerobic ponds;
- Destruction of methane generated from manure in piggeries;
- Estimating sequestration of carbon in soil using default values;
- Fertilizer use-efficiency in irrigated cotton;
- Reducing GHG in beef cattle through feeding nitrate-containing supplements;
- Reducing greenhouse gas emissions in milking cows through feeding dietary additives;
- Carbon soil sequestration in grazing systems.

(Australian Government, 2020)

If all necessary requirements are met, the Regulator issues Australian Carbon Credit Units (representing one tonne of carbon dioxide equivalent net abatement achieved by eligible activities) in relation to the proposed project. Following this, the Regulator purchases Credit Units on behalf of the Government through a contract with the farmer. Once a contract

has been made, the proponent can seek funding for the project and secure a forward-investment contract. The Regulator can purchase carbon abatement through reverse auctioning, tendering, or via another method. So far, purchases have been made through reverse auctions, in which a project proponent bids a price for the carbon abatement expected from the project. The winning bids, i.e. those that achieve the largest amount of abatement at lowest cost, are contracted. The volume of emissions reductions from the agriculture sector under the scheme, so far accounts for 17.7 million tonnes of CO₂ equivalent (CO₂ eq), which equals 9 percent of total contracted abatement (Australian Climate Change Authority, 2017).

The Australian experience can be the basis for lessons learned and recommendations to other policymakers and legislators around the world who wish to develop a regulatory framework aimed at stimulating farmers to adopt farming practices for GHG emission reduction or for broader climate-smart practices. Several lessons learned have been pointed out in recent research, such as:

- To be reliable and effective, regulations and policies aimed at stimulating carbon farming should have a long-term impact, given the fact that farmers have to implement structural changes to their farming practices, requiring a long-term certainty that carbon credits will earn an acceptable minimum price. In Australia's case, the CFI provides for a crediting period of 25 years for soil sequestration projects, 7 years for emission avoidance offsets projects, and a 100 years permanence period for vegetation projects.
- The switch from a purely market-based mechanism to a scheme in which the government buys credits for a fixed price, was reported in 2015 to have led to increased participation by farmers because it reduced uncertainty about future revenues. This demonstrates the importance of stable and long-term planning for this sector.
- The regulatory framework needs to include detailed legal rules on monitoring, reporting and verification systems (MRV). In contrast with most sectors, in agriculture, MRV is very site-

specific and can be labour-intensive, especially in the case of carbon sequestration. As of today, more research is needed to develop reliable and less labour-intensive methods to assess the amount of emission reductions achieved or carbon sequestered.

- Any such type of carbon credits policy is more likely to be successful if the focus is not placed on mitigation (emissions reduction) alone, but also on co-benefits such as adaptation, food security, and fostering resilient and secure jobs in the agribusiness sector: the ultimate goal should be to create resilient, sustainable farms.

(Verschuuren, 2017a)

Canada's (Alberta) Carbon Offset System

The Canadian Province of Alberta, which has an important oil and gas industry, has introduced first-of-its-kind legislation in North America that allows agricultural producers to generate carbon offset credits. Following from the *Climate Change and Emissions Management Act (SA 2003, c. C-16.7)*, the *Specified Gas Emitters Regulation (Alta. Reg. 139/2007)* of 2007 requires facilities that emit 100 000 tonnes or more of GHG a year to reduce their emission intensity. Under this Regulation, large industrial emitters who were obliged to comply with reduction obligations had the option to purchase offset credits from other activities that have voluntarily reduced their emissions in Alberta, including the agriculture sector. The result is the Alberta Emission Offset System, which includes a number of protocols that producers can follow in order to earn carbon offsets, from documented improvements to changes in practices (Government of Alberta, 2020).

The above programme was reformed on 1 January 2018 with the adoption of the *Carbon Competitiveness Incentive Regulation (CCIR) (Alta. Reg. 255/2017)*, which replaced the above-mentioned Regulation. The CCIR applies to any facility that has emitted 100 000 tonnes or more of carbon dioxide equivalent (CO₂ eq) GHGs in 2003 or any subsequent year. This excludes carbon dioxide (CO₂) emissions associated with biomass. A facility with fewer than 100 000 tonnes of CO₂ eq GHG emissions

per year may be eligible to opt-in to the CCIR if it competes against a facility regulated under the CCIR or has greater than 50 000 tonnes of annual emissions and high emissions intensity and trade exposure. The CCIR retains flexibility for compliance, including on-site reductions and generation of emissions performance credits, use of credits or offsets, and payment to the Climate Change and Emissions Management Fund.

Producers are provided with information on applicable agricultural methods prepared by the Agriculture and Rural Development Department. These include:

- Conservation cropping: this method is now the main carbon protocol of use to farmers. A new requirement for sign up of potential 2018 quarters in an aggregation project by 1 May, was introduced in 2018.
- Agriculture nitrous oxide emission reduction: based on improving nitrogen fertilizer efficiency, putting more nitrous oxide in the crop and less in the air.
- Beef feed, genetics and life cycle – only minor results achieved to date.
- Dairy industry: more efficient production of milk from dairy cattle, which reduces methane and nitrous oxide emissions – no projects registered to date.
- Biogas production from manure.

To qualify for offset credits, projects must follow the government-approved protocols and must be registered in the Alberta Emission Offset Registry. Once registered, the offsets can be sold to Alberta's large emitters that have not met their provincially mandated reduction obligation. The price that facilities pay for the offsets is market driven.

Other jurisdictions with Emissions Trading Systems related to agriculture

Other countries where ETS are in place allow for the generation of credits from agriculture, and their use as offsets by industries required to submit

emission allowances, and will be linked to other regulatory instruments aimed at reducing GHGs (Verschuuren, 2017a):

- Under California's ETS, two types of agricultural offset projects are accepted, each aimed at reducing methane emissions: biogas systems in dairy cattle and swine farms, and rice-cultivation projects.
- Japan has an offset-credit system linked to various, mostly voluntary, programmes for industry and the energy sector, allowing individuals, businesses, and local governments to invest in offset projects, with the aim to reduce emissions and to expand job opportunities, support domestic project proponents, and vitalize local industries. Four agricultural methodologies were adopted under this system: i) mitigation of nitrous-oxide emissions from tea-land soil by application of chemical fertilizers containing a nitrification inhibitor; ii) mitigation of methane emissions from flooded rice paddies by application of composts instead of rice straws; iii) reduction in emissions from livestock excrement management through changed management methods; and iv) reduction in emissions from the disposal of pig excreta through replacement of conventional feed with low-protein formula feed.

Of note, while these initiatives are primarily aimed at GHG emission mitigation, they do not contemplate measures addressing the resilience of the agriculture sector to the impacts of climate change, as is the case in the Australian legislation reviewed previously. As such, they have a narrower scope with regards to CSA, and offer interesting but less comprehensive and sustainable models of including agriculture at large in a carbon pricing instrument (Verschuuren, 2017).

Carbon taxes and agriculture

The use of carbon taxes addressing direct emissions from agriculture (as opposed to taxes targeting fuel consumption in agriculture production, for example) is still a relatively unexplored field. In 2013, Swedish authorities proposed a first-of-its-kind "meat tax" to reduce meat

consumption on the grounds of its contribution to global warming. The European Union's 'Roadmap 2050' mentions that it would be desirable to re-orient consumption towards less carbon intensive food (Bähr, 2015). However, currently there seems to be no initiative in force in this regard. This situation might change in the near future, as increased attention is devoted to the topic of healthier diets and sustainable food systems. A prominent example is the EAT-Lancet Commission study on *Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems* (Willett *et al.*, 2019).

Research suggests that, for instance, a carbon tax could be imposed on meat consumption (as opposed to at production stage) of domestic and imported meats (based on a hypothetical case in the European Union). The proponents of such a tax highlight that it could, in theory, be imposed on any food product, but given the relatively high impact of meat (especially beef) production in terms of GHG emissions, and the impact that a tax would have on consumption (based on examples of alcohol and tobacco), this would be an option with significant impact. This research emphasizes that such a meat carbon tax would provide important economic and environmental advantages over command-and-control regulation. In particular, a carbon tax would be a tool through which to internalize the environmental externalities involved with meat production and consumption. Moreover, such a tax would provide signals to 'get the prices right', reflected on taxation to be levied on actual GHG emissions per kg of meat (Bähr, 2015).

Another option is to subsidize alternative protein sources (e.g. rich plant or insect-based proteins), for instance through subsidizing or through differential tax treatment (e.g. allocation of beef in a higher sales tax category, and plant based alternatives in a lower sales tax category).

At the same time, the Consultative Group for International Agricultural Research (CGIAR) warns that while carbon price policies deliver cost-efficient mitigation across sectors, they can at the same time result in trade-offs with food security and other sustainable development goals. This could be the case, for example, with a uniform carbon tax on agriculture production across the world, which could lead to an increase in food prices

and, consequently have a negative effect on food security and livelihoods. CGIAR highlights that win-win mitigation options that reduce trade-offs between GHG mitigation and food security are necessary in order to avoid mitigation at the expense of food security in the most vulnerable regions of the world. Such options include soil organic carbon sequestration, sustainable intensification, shifting diets towards less GHG-intensive products, and reducing food waste and post-harvest losses (Frank, 2017).

Box 4.4

A regional perspective on integrating climate and agriculture policies: measures within the European Union Common Agriculture Policy (CAP) and Emissions Trading System (ETS) policies

According to the Eurostat GHG statistics, of the 28 European Union Member States, GHG emissions from agriculture accounted for a total of 471 million tonnes of CO₂ equivalents in 2012, which represented about 10 percent of total GHG emissions within the Union. To mitigate climate change, the European Union sets several targets, such as an European Union-wide reduction of GHG emissions by 20 percent by 2020 and a 20 percent reduction of GHG emissions coming only from the agriculture sector by 2050, according to the European Union's 2050 low-carbon economy roadmap (European Commission, 2020a). The CAP is the over-arching European Union agricultural policy, aiming to ensure a decent standard of living for farmers and to provide a stable and safe food supply at affordable prices for consumers. The CAP has identified three priority areas:

1. Biodiversity and the preservation and development of 'natural' farming and forestry systems, and traditional agricultural landscapes.
2. Water management and use.
3. Addressing climate change.

The CAP implements a system of agricultural subsidies and other programmes, which aim to encourage farmers to apply climate-friendly practices and

Box 4.4 *(cont.)*

techniques, broadly consisting of two groups of measures (Verschuuren, 2017b):

- Direct payments linked to environment-friendly practices (Regulation (EU) No. 1307/2013): this Regulation creates a set of common rules for direct payments to active farmers and includes a mandatory “greening” component and a focus on young farmers. Payments are granted directly to farmers to ensure them a safety net. They are granted in the form of a basic income support which is unlinked to production. This stabilizes their income from market sales, which are subject to volatility. At the same time, farmers must comply with certain requirements in the areas of public, animal and plant health, the environment and animal welfare. Particularly important is the Green Direct Payment, granted for implementing three compulsory practices, namely crop diversification, ecological focus areas and permanent grassland, whose environmental benefits on biodiversity, water and soil quality, carbon sequestration, and landscapes, have been proven.
- Market measures (Regulation (EU) No. 1308/2013): this Regulation creates the basic elements for a common organization of markets in agricultural products, such as private storage aid for certain products listed in the Regulation, etc.

The preceding measures are an example of how to integrate climate objectives into agriculture sector policies through the use of incentives. However, the current CAP is seen as having certain drawbacks which hamper the widespread adoption of CSA; short commitment periods, the fact that accounting is not based on the quantification of carbon sequestration or emissions reduction, and that payments are based on numbers of hectares under a certain management scheme instead of on the amount of carbon sequestered or avoided emissions (Verschuuren, 2018).

The cornerstone of the European Union climate policy is the European Union Emissions Trading System (EU ETS). The Trading System creates a market in the shape of a cap-and-trade system which applies to various sectors and covers approximately 45 percent of the European Union’s GHG emissions

Box 4.4 (cont.)

(European Commission, 2020b). Agriculture is not covered by the EU ETS, but many sectors that fall outside of its scope are catered for by the related *Decision 406/2009/EC on the Effort of Member States to Reduce Their GHG Emissions to Meet the Community's GHG Emission Reduction Commitments up to 2020 (Effort Sharing Decision)*, which establishes binding annual GHG emission targets for Member States for the period 2013–2020. In contrast to sectors covered by the EU ETS, which are regulated at European Union level, for sectors covered by the Effort Sharing Decision, it is the responsibility of Member States to define and implement national policies and measures to limit emissions from the sectors.

This mechanism is not as strong as that of the EU ETS, since it covers emissions from the agriculture sector only as far as emissions from livestock are concerned, and emissions from LULUCF are explicitly excluded. This means that certain measures, such as soil carbon sequestration efforts, are not covered by the Decision. As a consequence, most Member States do not have binding rules in place that aim at climate change adaptation or mitigation in the agriculture sector.

Further to the adoption of Regulation 2018/841/EU addressing the inclusion of GHG emissions and removals from land use, land use change and forestry into the overall 2030 climate and energy framework, there should be a balance between GHG emissions and removals in LULUCF, including agricultural land use for arable crops and grasslands as of 2021. The Regulation rewards Member States that manage to increase carbon sequestration in soils, or who increase vegetation in the land sector (including agriculture). As a consequence, soil carbon sequestration will become a policy option for consideration by the Member States, although only to a limited extent: only 280 million tonnes of CO₂ equivalent can be accredited to land use measures of a total of 2 500 million tonnes emitted by the Effort Sharing Decision sectors (Verschuuren, 2018). Nonetheless, these measures will play an important role in integrating agriculture into the overall climate policy, providing an interesting example of measures that can be taken not only at regional level but also at national level.

4.2.6. Disaster risk management and response in agriculture

Disruptions due to the changing climate are increasing the challenges and risks faced by those undertaking agricultural activities. Both the gradual worsening of climatic conditions (slow-onset disasters), as well as natural disasters (sudden-onset disasters), have been impacting on agricultural activities and food security for some time. For instance, water shortages in droughts and heat waves have a negative impact on crops as well as livestock. Excessive precipitation, floods and inundation, as well as an increased and changing occurrence of pests, weeds and diseases, are other examples of climate effects that can have devastating impacts on food production.

Disaster risk responses (DRR) and disaster risk management (DRM) are therefore an important component of dealing with climate change affecting agriculture. For instance, some forms of adaptation measures comprise DRR. Mitigation measures, for example, actions like forest establishment, restoration and rehabilitation, increase resilience of ecosystems to resist disasters by lowering vulnerability to landslides, land degradation and the erosion of gulleys, which depletes most soil nutrients. The DRR and DRM approaches include three successive stages, each building upon the former:

1. The disaster mitigation phase: this phase begins with the adoption of sustainable farming practices and adaptation measures. The adoption of such practices could be stimulated and facilitated by laws and policies, for instance, by introducing early warning systems aimed at helping farmers to prepare for and manage climate disasters or enhancing access to climate and weather information and forecasts for the agriculture sector. This phase is considered the most relevant of the three, given that it is easier to prevent than to remedy impacts afterwards.
2. The disaster response phase: in the agriculture sector, this usually concerns food supply, given that local communities are dependent on local agriculture for their own supplies. Although a comprehensive international legal framework for disaster relief

is still lacking, there are various international law instruments in place that set principles and guidelines on how to supply food to those who are in need, including the obligation to fulfil the right to food. The further development of a comprehensive international legal framework for disaster response that also focuses on agriculture and food security is considered an urgent requirement. Other relevant factors include the protection of agriculture-based livelihoods in disaster responses (for instance, through provision of productive inputs, assets such as cash, and technical support).

3. The compensation and rebuilding phase: this includes assistance to create a more resilient agriculture sector so that it is better suited to deal with future disasters. Financial support to help farmers invest in climate smart practices and technologies is considered important. Various forms of insurance policies are increasingly becoming available to insure against agricultural losses due to climate disasters. Other relevant factors include investment to improve national capacities in developing and disseminating technologies, and to support livelihood diversification.

(Verschuuren, 2017c)

Some areas of law such as zoning and spatial planning legislation can be used as instruments to promote DRM/DRR approaches, as noted previously. The following subsections explore other potential regulatory instruments that can be used to promote DRM and DRR at the national level.

Early warning systems

The use of weather information to assist farmers and rural communities in managing the risks associated with climate variability is a potentially effective element for adaptation to climate change. It is applicable to all systems, particularly land-based systems that depend heavily on local feed availability and which are more vulnerable to production failures (FAO, 2017d). An example of this put into practice is Vanuatu's

Meteorology, Geological Hazards and Climate Change Act (No. 25 of 2016).

The Act defines DRR as

the concept and practice of reducing disaster risks: (a) through systematic efforts to analyse and manage the causal factors of disasters; and (b) including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

One of the Act's objectives is to

ensure that the government and the public are informed of matters related to weather, climate and geological hazards, and are able to make effective use of such information and data, and to respond to warnings and alerts about such events, in order to protect the environment and the safety and welfare of the community.

The precautionary principle is to be applied to ensure that, in the event of a threat of damage to the environment or a risk to human safety and health from weather events, geological hazards and the impacts of climate change, the lack of scientific certainty regarding the extent of adverse effects is not used as a pretext to prevent or avoid a decision being made to respond to or to minimize the potential adverse effects or risks. In terms of concrete measures, the Act envisions the establishment of the National Advisory Board on Climate Change and Disaster Risk Reduction, whose members are the Directors of departments such as Climate Change, Energy, Forestry and the Environment. Furthermore, the Act mandates the Director of the Department of Meteorology to develop programmes to support early warning systems in relation to adverse weather events.

Climate insurance mechanisms for agriculture

Erratic weather and extreme climate events threaten farmers' livelihoods through the loss of productive assets. Moreover, the uncertainty associated with climate variability is a disincentive to investment in agricultural innovation. Climate-related risk is considered to contribute to poverty traps, impeding the kinds of transformation that smallholder

agriculture needs in order to adapt to climate change. The reduction of such risks through the development of innovative insurance schemes can play a part in stimulating the entrepreneurship and innovation needed for agricultural development. It is pointed out that private insurance markets may be of limited benefit to large vulnerable populations facing risks linked to climate change. In such situations, public-private partnerships could be more appropriate (FAO, 2017d).

The Republic of Korea is an example of a country that has enacted legislation envisioning agriculture insurance. The *Agricultural and Fishery Disaster Insurance Act (No. 9 477 of 2009, amended by Act No. 12 729 of 2014)* of 2009 aims to contribute to stability in the management of agriculture and fisheries by providing disaster insurance for losses resulting from disasters to agricultural crops, forestry products, cultured fishery products, livestock, and facilities for agriculture and fisheries.

A specific type of agricultural insurance that has been gaining recognition for climate related events is index-based insurance. Insuring agriculture activities normally relies on direct measurement of the damage that each farmer suffers. However, assessing the damage is both costly and time consuming, particularly where there are a large number of dispersed farmers. In index-based insurance mechanisms, payouts are triggered not by the actual measured loss, but are triggered when an index – such as rainfall or average yield – falls above or below a pre-specified threshold. This lowers administrative costs and premiums compared with conventional crop insurance. Farmers can purchase insurance individually or in groups, such as a cooperative or microfinance institution. Alternatively, a national government may subsidize insurance for farmers. Establishing a legal and regulatory environment for enforcing contracts that both buyer and seller can trust is a fundamental prerequisite for index insurance. This often requires public-private partnerships that bring together government, local insurers and international reinsurers (who primarily provide financial risk transfer capacity) (Dinesh *et al.*, 2017).

One example of index-based insurance comes from the East Africa Agriculture and Climate Risk Enterprise, the largest agricultural insurance

programme in sub-Saharan Africa, if not the largest in the developing world.¹⁶ The Enterprise acts as an intermediary between insurance companies, reinsurers, and distribution channels/aggregators (e.g. microfinance institutions, agribusiness and agricultural input suppliers). Among other services, it offers insurance that is linked to agricultural credit from Micro-Finance Institutions, and a service that links insurance to a replanting guarantee by a seed company. The insurance premium is incorporated into the price of a bag of maize seed. Each bag contains a scratch card with a code that is texted to the Enterprise at planting time, to start coverage against drought. Each farm is monitored using satellite imagery for 21 days. If the index is triggered, farmers are automatically paid via a mobile phone platform. The indexes used are based on several data sources, including solar-powered automated weather stations, satellite rainfall measurements, and government area yield statistics. It is reported that farmers insured under this mechanism have invested 19 percent more in farm productivity, resulting in 16 percent more earnings compared to their uninsured neighbours (Dinesh *et al.*, 2017).

4.2.7. Support for scientific research on climate change and agriculture

Further to the enabling mechanisms already mentioned, there is also the need to support institutional policy development related to climate change and agriculture. It is widely recognized that complete and reliable research data is crucial in all areas of law and policy development. An illustration of this is Turkey's *Regulation on the research and application centre on agriculture and climate change of the Selcuk University (7 June 2019)*. The Regulation sets out provisions on the purpose, scope, management, functions, and administration of the research centre, whose main functions are: to carry out research on the impacts of climate variability on agricultural practices; to offer solutions for problems encountered in practice; and to raise awareness of both producers and scientific councils on CSA knowledge and practices through training, dissemination of information and capacity building efforts. Furthermore, the Centre is to undertake research on climate change in the areas of

¹⁶ For more information see <https://acreafrica.com/>

horticulture, plant protection, food engineering, agricultural economy, agricultural engineering, irrigation, soil conservation, plant production and zootechnical disciplines. The Centre is also tasked with undertaking research on climate-resilient crops and livestock breeds. In order to carry out all these activities, the Centre is to develop its required infrastructure and strengthen its coordination and cooperation with other sectoral actors and national and international professional organizations. The Centre is to offer solutions to mitigate the impacts of climate change on agriculture to the relevant institutions in the policy development process.

4.3. Legislation on specific areas related to agriculture and climate change

In addition to an enabling legal and institutional framework concerned with the cross-cutting issues and areas of law highlighted in Section 4.2, legislation on specific policy areas is also instrumental for the achievement of sector-specific, climate-related goals in agriculture. In this Section, we shall look at what could be done in the legislative and regulatory spheres to support soil management, crop and livestock production, and how these can incorporate climate change considerations.

4.3.1. Soil management and climate change

Healthy soil is an essential resource and a vital part of the natural environment, contributing to the achievement of SDGs such as food security, climate action, good health and well-being. Soils constitute the largest terrestrial carbon pool and play crucial roles in the global carbon cycle by regulating the biogeochemical processes and the exchange of GHGs with the atmosphere. The role of soils and soil organic carbon (SOC) in the climate system and its relevance to climate change adaptation and mitigation has been widely recognized in scientific studies, as pointed out by FAO. In fact, under the UNFCCC, the national SOC stock changes are assessed annually in relation to the GHG emissions (FAO, 2020d).

Soil health can be achieved, in particular, through maintaining soil organic matter; a complex mix of organic compounds that together are responsible for many of soils' key functions, such as: carbon storage;

availability and cycle of nutrients; biodiversity conservation; porosity, aeration, water-holding capacity, and hydraulic conductivity; thermal properties; and mechanical strength (FAO, 2017i). FAO emphasizes that soils have become one of the world's most vulnerable resources in the face of climate change, land degradation, biodiversity loss and increased demand for food production, while the protection and monitoring of soil resources at the national to global levels face complex challenges.

Despite these challenges, soils continue to make a valuable contribution to the maintenance of key ecosystem services. Improving soil quality is considered important for mitigating the effects of land-use changes and increasing adaptation to and mitigation of climate-related disaster risks. For instance, FAO estimates that soils can sequester around 20 Pg C in 25 years, an equivalent to more than 10 percent of the anthropogenic emissions (FAO, 2020e). Increased resilience of soils can be a positive side effect of carbon-offset projects, particularly in activities promoting soil conservation, protection, and restoration. For example, in the agriculture sector, activities focusing on the increase of carbon sequestration in soils through increased mulching and minimum tillage can lead to increased soil fertility. This also contributes to better moisture retention, which is expected to result in an increase in production, better water management, and a reduction in the use of fertilizers. Research has also found that farmers using sustainable agriculture practices that cater for the health of soils have greater chances of coping with extreme weather events (Verschuuren, 2017c).

Sustainable soil management (SSM), as an integral part of sustainable land management, focuses on differences in soil types and soil characteristics as a basis for specifically designed interventions aimed at enhancing soil quality based on the selected use of land. The *Voluntary Guidelines for Sustainable Soil Management* (see Section 4.1.6) provide guidance to countries on relevant principles and measures that can be taken to promote sustainable soil management and enhance soil health.

Given the importance of soil, it is paramount to create mechanisms to protect and restore this precious resource for present and future generations. The FAO Global Soil Partnership (GSP) was established

in December 2012 as a mechanism to develop a strong interactive partnership between all stakeholders, with enhanced collaboration and a synergy of efforts. From land users through to policymakers, one of the key objectives of the GSP is to promote sustainable management of soils and improve soil governance.

Despite its intrinsic value, the importance of overall soil health is sometimes overlooked by policymakers and this leads to increased soil depletion. In the 2015 report, *Status of the World's Soil Resources*, the GSP raised awareness on the drivers of global soil change (FAO and ITPS, 2015). The report explains the current major threats to soil health, which are: nutrient imbalance; acidification; biodiversity loss; compaction; contamination; erosion; SOC loss; salinization; soil sealing; and waterlogging. Potential legislative responses to address these challenges and ensure legal support to achieve sustainable use of the soil and its implications on the environment, are reviewed in the remainder of this section.

It is the pollution of soils that has so far attracted the most attention from law and policymakers. In developed countries, legislation on contaminated sites and the related regulatory mechanisms are well established. European Union Member States, for instance, have adopted the Soil Thematic Strategy, a common framework that aims for the sustainable use of soil, preservation of the soil as a resource, and the remediation of contaminated soil. However, there is still a lack of understanding of the extent of contaminated sites. The 2018 report *Status of local soil contamination in Europe* asserts that there are about 2.8 million contaminated sites but only 650 000 of those are registered (Payá Pérez and Rodríguez Eugenio, 2018).

Considering the knock-on effects of the loss of soil productivity and the extent of soil erosion, land degradation and desertification are likewise extensively addressed by legislation worldwide. Algeria is an example of a country that has established measures to minimize soil erosion under its *Programme d'Action National (PAN) sur la lutte contre la Désertification* (2003), highlighting specific techniques

and measurements to reverse the erosion process. Georgia has also developed recommendations for the protection of soil from erosion. *Order No. 2-277 of 2005 of Minister of Agriculture of Georgia on Recommendation for Complex Measures for Protection of Soil from Erosion* is aimed at minimizing erosion, increasing productivity and fertility of soil, and improving the quality of agricultural products.

A comprehensive IUCN study on national soil legislation from around the world indicated that countries have adopted a variety of legislative approaches to address soil protection and management. The study highlighted several areas that pose challenges to the effectiveness of such legislation (IUCN, 2004). The most prominent are listed here below:

- Some countries developed a framework comprised of several pieces of legislation to manage soil challenges and land challenges separately. However, these frameworks often lack a coordination mechanism to ensure effective implementation.
- Most of the legislation does not take into account the ecological characteristics of soils as a premise for land use decision-making. Instead, it tends to adopt an approach aimed at fixing soil problems rather than preventing soil degradation.
- Many laws do not have a clear statement of purpose and objectives related to soil management.

The study also provides guidance on developing legislation for SSM, indicating several areas of law that can be covered at the national level. Countries need to assess their national policy priorities in order to identify the legal approach that is most suitable to achieve such goals. Potential options for legislative action include:

- soil conservation laws, which include soil conservation planning provisions, among others;
- legislation protecting land for soil conservation purposes, which includes elements such as specification of land use activities and setting land aside for soil conservation or specifying prohibited activities (e.g. no burning of residues on the ground);

- legislation protecting soils in forestland and agricultural land; particularly for the latter, provisions might include declaring land areas to be conserved as agricultural soil and prohibiting other uses of that land, specifying the types of crops that can be grown, etc;
- legislation specifically controlling soil erosion, which can include measures specifying conservation methods that should be applied in particular areas, such as methods of ploughing, and specifying landscape and land use limits;
- legislation to control soil pollution, which can include issues such as specifying the use of sludge on agricultural land or nitrate vulnerable zones, or management of contaminated sites;
- legislation to establish soil conservation bodies (e.g. committees and boards) and institutions.

(IUCN, 2002)

Bulgaria is an example of a country with comprehensive soil legislation that also considers climate-related issues. The Bulgarian *Soils Act (No. 89 of 2007, as amended in 2011)*, identifies as its objectives the protection of soils and their functions, as well as the sustainable use of soil and its long-term restoration. Soil function is defined in the text as the

capacity of soils to perform ecological, economic, social and cultural functions such as: (a) biomass production, including in agriculture and forestry; (b) storage, filtering and transformation of nutrients and water; (c) source of raw and prime materials; (d) a physical and cultural environment for humans and their activities; (e) conservation of biodiversity (habitat, species and genes), of carbon reserves and of the geological and archaeological heritage.

The Act establishes that soil protection, use and restoration shall be predicated on principles such as an ecosystems approach, sustainable use, preventive control, application of good practices and the 'polluter pays' principle. At the same time, it prohibits certain activities that lead to soil erosion, it prohibits disposal into soils of pollutant sewage, deforestation of certain areas, and forbids agricultural practices that lead to salinization or contamination of soils. Soil waste disposal

standards are to be established by the competent authority. Owners of physical infrastructure are required to maintain them in such manner so as to prevent soil degradation. The Act calls for the competent authority to carry out inventorying through preliminary surveys and research, to undertake detailed surveys that involve risk assessment, to develop projects for restoration in areas with degraded soils, and to monitor and maintain areas with restored soil functions. The competent authority is also tasked with an assessment of the condition of the soils, disaggregated by sector of the national economy. Monitoring of qualitative and quantitative indicators characterizing soil conditions and changes, as well as data sources, are also provided for. In addition, the Act calls for the development of a National Programme for Soil Protection, Sustainable Use and Restoration, that is subject to an environmental assessment in accordance with environmental legislation. The National Programme is to guide five-year regional programmes, which are to be an integral part of administrative regional development programmes. Regional programmes should guide three-year municipal programmes for soil protection, sustainable use, and restoration.

Costa Rica is another country with a comprehensive set of soil legislation that tackles threats to soil health as well as soil rehabilitation. General notions of sustainable management and soil conservation are reflected in multiple laws that are aligned with different sectors, such as environment, mineral resources, and agriculture. In 1998, Costa Rica passed *Ley N° 7779 sobre uso, manejo y conservación de suelos (1998)*, which introduced important coordination mechanisms between government bodies, to ensure that soil conservation and rehabilitation is undertaken at both national and regional levels. In 2000, an implementing *Decree 29 375/MAG/MINAE/S/MOPT – Reglamento a la Ley sobre uso, manejo y conservación de suelos*, explicitly regulates the use and management of soils. A 2009 *Decree N° 35 368/MAG/S/MINAET – Reglamento para quemas agrícolas controladas*, amended the 2000 Decree to regulate agricultural burning through a permit system. The 2009 Decree also establishes the measures to be used to prevent damage to soils from agricultural burning.

An example of regional action in this area is the *Convention concerning the Protection of the Alps* of 1991, which includes soil conservation measures, among others. Parties to the Convention (Austria, Switzerland, France, Germany, Italy, Liechtenstein, European Union, Monaco and Slovenia) established compliance mechanisms with the aim to: i) reduce the incidence and gravity of soil degradation; ii) control soil erosion; iii) restrict soil sealing of Alpine soils;¹⁷ and iv) increase sustainable management of soils and the restoration of their natural functions. Incentives for legal cooperation between countries contribute to the strengthening, sharing and accelerating of goals in common to consolidate soil conservation.

The examples and considerations discussed provide pathways to other countries aiming to act on soil conservation, protection, and rehabilitation. Greater attention needs to be paid to soil degradation processes and the measures available to curb it, such as sustainable soil management practices, and to ensure that these issues are adequately understood and reflected in legal texts, making SSM a reality.

4.3.2. Crop production and climate change

As mentioned at the beginning of this Chapter, a large proportion of countries' NDCs on adaptation and mitigation policies in agriculture, (broadly) refer to cropland management and other management measures including those for nutrients, tillage/residues, plants and water. Importantly, it is key to ensure that such climate mitigation and adaptation efforts are balanced with food security and livelihoods needs of those dependent on the agriculture sectors, in line with the CSA approach.

Legislation can be instrumental for implementing the CSA approaches outlined preceding sections. For instance, some countries have general rules that link crop production to environmentally sustainable practices.

¹⁷ Soil sealing is the destruction or covering of soils by buildings, constructions and layers of completely or partly impermeable artificial material (asphalt, concrete, etc.). It is the most intense form of land take and is essentially an irreversible process.

In Kenya, the *Crops Act (No. 16 of 2013)* mandates that

the national government and county governments shall be guided by the principles in the management and administration of agricultural land that land owners and lessees of agricultural land, being stewards, have the obligation to cultivate the lands they own or lease and make the land economically productive on a sustainable and environmentally friendly manner.

These provisions are to be implemented in coordination with the mandate of all public entities to mainstream climate change, as per the mandate of the Kenya *Climate Change Act (No. 11 of 2016)*, which also applies to agriculture.

Furthermore, some countries are already incorporating specific climate-related goals into their agriculture-related laws. The Mexican State of Nayarit's *Ley para el desarrollo agrícola sustentable del Estado de Nayarit* of 2012, establishes the grounds for the promotion of the sustainable development of agriculture. The Law contains several mechanisms which exemplify the integration of CSA considerations. The State's local governments are each required to formulate a Sectoral Programme for Sustainable Agricultural Development. The guiding principles for such Programmes are equity; profitability and sustainability in the development of the sector; planning based on ecological considerations; and adaptation and mitigation to climate change. They should include provisions guiding agricultural producers on the uptake of good agricultural practices in order to increase their production and productivity, while avoiding damage to the environment and respecting the borders of forest areas (therefore including all three elements of CSA). Sustainability is envisioned as a guiding criterion in the promotion of agricultural production activities, in order to achieve the rational use of natural resources, their preservation and improvement, as well as viability of the economic development of the State. To support the achievement of sustainable production, the State authorities are to define measures that agricultural activities can use to adapt and mitigate climate change and to improve soil conservation. Furthermore, the Law contains provisions on other measures such as economic incentives;

insurance related to climatic variations; promotion of research on climate change and its effects on farming; adoption of technologies that conserve and improve the productivity of land; biodiversity and environmental services; and regulations on the sale and distribution of seed varieties or hybrids to increase the ability to adapt to climate change.

Legislation can also be useful to provide a framework to support the development of specific approaches to crop production such as conservation agriculture, organic agriculture and agroecology which encompass CSA goals and methods into their conceptual framework. Laws often also contain provisions on related incentives and financing schemes provided by governments (e.g. tax breaks or subsidies) and private entities (e.g. certification schemes). The following subsections explore legislative and regulatory entry points on how countries can attempt to foster these approaches that are conducive to CSA.

Conservation agriculture

One conceptual approach that has become widely recognized is conservation agriculture (CA), which has emerged as an alternative to conventional agriculture as a result of losses in soil productivity due to soil degradation (e.g. erosion and compaction). The CA approach aims to reduce soil degradation through several practices that minimize the alteration of soil composition and structure and natural biodiversity. It aims to make better use of agricultural resources through the integrated management of available soil, water and biological resources, combined with limited external inputs. This approach contributes to environmental conservation and to sustainable agricultural production by integrating issues such as maintaining a permanent or semi-permanent organic soil cover, reducing or eliminating damaging practices such as tillage, and other enabling factors such as direct seeding and a varied crop rotation, into production systems. Adoption of CA at the farm level is associated with many benefits such as lower labour and farm-power inputs, more stable yields and improved soil nutrient exchange capacity, increased crop production profitability over time compared to conventional agriculture, decreased CO₂ emissions, and conservation of soil and terrestrial biodiversity (FAO, 2001).

CA as a production system has the potential to deliver on both sustainability and intensification, and its principles are widely applicable across a range of farming systems. It is reported that CA is applied on 155 million hectares of arable land (in 2013) across many different agro-ecosystems in all continents. Further, it is recognized that enabling factors such as an adequate policy environment is an important determinant of whether CA is adopted and at what pace (Kassam *et al.*, 2014).

The Bulgarian *Law on the Preservation of Agricultural Lands (1996, as amended in 2003)*, provides an example of how several aspects of the CA approach can be institutionalized. The Law's objectives are to preserve agricultural lands from damage, to restore and improve the fertility of agricultural lands and to determine the conditions of land use change. The Law states that agricultural lands are a basic national wealth and shall only be used for agricultural purposes in such a way so as not to damage the soil fertility and its health. Agricultural landowners and users are under obligation to preserve land from erosion, pollution, salination, oxidation, swamping and other damages, and to maintain and improve the quality of their soils and lands. Owners are free to choose which agricultural activity to pursue on their land, provided that it does not cause damage to their own or neighbouring lands, nor to surface and underground waters. At the same time, the Law lists prohibited practices such as: the use of pesticides, fertilizers and biologically active substances that are not registered by the responsible entity; the burning of stubble and other vegetal residuals on agricultural lands; the use of organic sediments from industrial and other waters and household waste without the permit of specialized bodies of the ministry; and the use of irrigation waters that contain harmful substances and waste above the admissible levels. The Law also provides for tax breaks to support agricultural landowners so that they are in a position to observe restrictions and follow the Law's requirements.

Organic agriculture

In line with the CSA approach,

organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity,

biological cycles, and soil biological activity. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system (Codex Alimentarius, 1999).

According to the Codex, *Guidelines for the Production, Processing, Marketing and Labelling of Organically Produced Foods*, an organic production system is mainly designed to:

- enhance biological diversity within the whole system;
- increase biological activity in soil;
- maintain long-term soil fertility;
- recycle wastes of plant and animal origin in order to return nutrients to the land, thus minimizing the use of non-renewable resources;
- rely on renewable resources in locally organized agricultural systems; promote the healthy use of soil, water and air, as well as minimize all forms of pollution thereto that may result from agricultural practices;
- handle agricultural products with an emphasis on careful processing methods in order to maintain the organic integrity and vital qualities of the product at all stages.

Organic agriculture is believed to produce significant social, economic and environmental benefits. Broadly, it is seen as an environment and ecosystem-friendly approach because of its emphasis on minimum tillage and reduced use of pesticides, herbicides and synthetic fertilizers. Organic agriculture is also expected to play a major role in combating desertification, preserving biodiversity, contributing to sustainable development and promoting animal and plant health (FAO, 2012).

More specifically, it is recognized that organic agriculture provides both climate adaptation and mitigation benefits as compared to conventional agriculture techniques. The FAO Organic Agriculture Programme points out that organic agriculture involves practices that can help farmers adapt

to climate change through strengthening agro-ecosystems, diversifying crop and livestock production, and building farmers' knowledge base to best prevent and face changes in climate. Furthermore, the organic agriculture approach is considered to result in lower emissions as compared to conventional production, based on production area. Benefits of organic agriculture include: avoidance of emissions of nitrous oxides from soil and methane from arable or pasture use or dried peat lands; increased soil organic carbon from organic fertilization; sequestration of larger amounts of CO₂ from the atmosphere to the soil; lowering GHG emissions for crop production and from enhanced carbon sequestration; and additional benefits for biodiversity and other environmental services (FAO, 2020f).

Guidelines for organic farming exist at the international level as part of the *Codex Alimentarius*, jointly managed by FAO and the World Health Organization (WHO). The *Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Foods* (Codex Guidelines) were developed in 1999, and have since been revised several times, the latest in 2013. The Guidelines are intended to facilitate the harmonization of requirements for (and trade in) organic products at the international level, and may also provide assistance to governments wishing to develop national legislation in this area. Organic standards have also been developed by the International Federation for Organic Agriculture Movements (IFOAM), an international non-governmental organization which acts as an umbrella organization for all organic agriculture organizations. The IFOAM *Organic Guarantee System* seeks to provide a common system of standards, verification and market identity for organic products (IFOAM, 2020). In addition, the International Organization for Standardization (ISO) has approved standards on certification systems that are applicable to organic production. Although these Guidelines are of a voluntary (or non-legally binding) nature, they are highly influential in the framing of national laws and standards on organic agriculture.

Numerous countries have introduced specific legislation on organic agriculture: as of 2016, 87 countries had such rules and regulations (Willer and Lernour, 2016). While organic agriculture legislation is, like

other types of agriculture legislation, context specific, a comprehensive FAO Legal Study points out the elements that could be covered, based on the Codex Guidelines, including:

- objectives, scope of application, principles and definitions to clearly delineate what types of agriculture come under the scope of the law;
- institutional issues (the designation and mandate of one or more authorities, mechanisms for institutional coordination and public participation, etc.);
- requirements for organic production (rules on plant and animal production, rules on handling and processing, as well as prohibitions of, or restrictions on, using certain substances or production methods);
- conformity assessment;
- labelling, packaging and marketing;
- supervision and conformity assurance;
- import and export regulations;
- violations and penalties;
- promotion of organic products.

The Study further notes that organic agriculture has mostly been regulated at the national level through secondary/subsidiary legislation such as regulations, ministerial decrees or notifications, with few examples of primary legislation for organic (not all) agricultural products. Another significant source of divergence amongst national legislation on organic agriculture relates to the degree of regulatory fragmentation: while some countries have integrated most organic standards and rules into one single legal instrument, others present a highly fragmented regulatory framework. In addition, a few countries have established national standards on organic production and handling/processing by way of instruments that have no legal force *per se*. Nonetheless, in both cases, compliance with these national standards is rendered mandatory

by the legal requirement of organic certification, usually laid down in a separate regulation (FAO, 2012).

One example is the *Organic Agriculture Act of 2010 (Republic Act No. 10068)* of the Philippines. Organic agriculture is defined in Section 3 as

all agricultural systems that promote the ecologically sound, socially acceptable, economically viable and technically feasible production of food and fibers. Organic agriculture dramatically reduces external inputs by refraining from the use of chemical fertilizers, pesticides and pharmaceuticals. It also covers areas such as, but not limited to, soil fertility management, varietal breeding and selection under chemical and pesticide-free conditions, the use of biotechnology and other cultural practices that are consistent with the principles and policies of this Act, and enhance productivity without destroying the soil and harming farmers, consumers and the environment (...).

Section 4 provides that the Act shall apply to the development and promotion of organic agriculture and shall include, but not be limited to, the following:

- a. policy formulation on regulation, registration, accreditation, certification and labelling of organic agriculture;
- b. research, development and extension of appropriate, sustainable environment and gender-friendly organic agriculture;
- c. promotion and encouragement of the establishment of facilities, equipment and processing plants to accelerate the production and commercialization of organic fertilizers, pesticides, herbicides and other farm inputs;
- d. implementation of organic agricultural programmes, projects and activities.

Section 24 of the Act contains a dedicated section on incentives such as exemption from the payment of duties on the importation of agricultural equipment, machinery and implements, potential tax incentives to organic input production and utilization, subsidies for certification fees and other support services to facilitate organic certification, among others.

Agroecology

Agroecology is not a specific practice but rather a conceptual approach that aims to promote a set of goals related to more sustainable food systems. The United States of America Department of Agriculture defines it as incorporating “ideas about a more environmentally and socially sensitive approach to agriculture, one that focuses not only on production, but also on the ecological sustainability of the productive system” (USDA, 2020). In recent years, it has been gaining recognition as a method for addressing climate change in the agriculture and land sectors in a holistic manner. Agroecology is based on applying ecological concepts and principles to optimize interactions between plants, animals, humans and the environment while taking into consideration social aspects related to a sustainable food system. Agroecology is seen as an approach that can support food production and food security and nutrition while restoring the ecosystem services and biodiversity that are essential for sustainable agriculture, and could thus play an important role in building resilience and adapting to climate change (FAO, 2020g).

These considerations denote that agroecology represents a broad and inclusive policy approach, which is adaptable and context sensitive and which does not strive to be prescriptive. At the same time, it is useful to differentiate agroecology from the other conceptual approaches highlighted previously. For instance, while organic agriculture can be a way of practicing agroecology, not all agroecological practices will necessarily fit into the more precise definitions of organic farming and its certification processes. Conversely, not all organic farming practices will apply the ecological approach advocated by the agroecology movement, for which an ecosystem view to the farmland and social aspects are also key. Furthermore, with regards to CSA, while agroecology makes use of ecosystem functions in order to reduce fossil fuel use and negative environmental impacts, paying particular attention to the circulation and efficiency of biogeochemical cycles, it can be a varied form of CSA that promotes both climate change adaptation and mitigation simultaneously, as well as sustainable production. However, according to the research by CIRAD on agroecology for tropical and mediterranean farming systems, some approaches that would fall under CSA would not be compatible with agroecology (CIRAD, 2018).

Building on a growing body of research, and its own initiatives in this field, FAO developed a set of principles, known as the “10 Elements of Agroecology” as a means to guide the transition to sustainable food and agricultural systems. FAO also recognizes that policy frameworks are key for the promotion of agroecology, promoting an integration across scales (from local to national and international) and sectors (from agriculture to other economic sectors policies, and from social policies to environmental ones). In particular, agroecology calls for governance solutions that can coordinate actions at the landscape and territorial scale. An enabling environment is essential for producers transitioning towards agroecology, and such an environment should include:

- formal, legal recognition of alternative market models, which support market access for agroecological producers, particularly small-scale farmers. Successful models include community-supported agriculture schemes, e-commerce and participatory guarantee schemes, which re-connect producers and consumers, rural and urban areas;
- public procurement programmes that can be used to promote agroecology and guarantee access to the market for agroecological production, taking into consideration the specificities and needs of producers, including scale, diversification of production, local values, and local varieties and products;
- establishing specific credit lines and investment schemes that allow flexibility for food producers, as well as insurance to support the agroecological transition;
- secure land tenure and access to natural resources, which are key to encourage farmers to adopt practices that require long-term investment in land and other assets;
- sanitary and phytosanitary measures, anchored on effective risk assessment with appropriate control systems that allow food producers to meet food safety requirements;
- an innovative definition of ‘agriculture’ in the legal system, one that allows or does not hinder the inclusion of innovative practices.

(CIRAD, 2018)

Currently, CIRAD estimates that about 100 laws from 28 countries cover agroecology and agroecological transitions to different degrees (CIRAD, 2018). However, given the broad spectrum of issues and approaches involved, there is no blueprint for how countries can legislate for promoting the uptake of agroecology.

In 2014, France adopted *Loi n° 2014-1170 du 13 octobre 2014 d'avenir pour l'agriculture, l'alimentation et la forêt* (Law on the Future of Agriculture, Food and Forestry). It followed an initiative on agroecology launched in 2012, aimed at promoting a shift towards combining economic, environmental and social performance, broken down into a variety of projects covering all areas (teaching, support for farmers, reorientation of public support, public and private research, etc.). The Law was developed jointly by the French Ministry of Agriculture and other actors in the sector, and sets as its objective that the majority of French farms be committed to agroecology by 2025. The Law provides for the practical implementation of agroecology, including education on the links between agricultural science and ecology and financial support for farmers switching to agroecological practices, among others. Amongst the aims of the Law are

I. To protect and enhance agricultural land. II. Public policies will aim at promoting and sustaining agroecological production systems, including the organic production method, which combine economic and social performance, particularly through a high level of social, environmental and health protection. These systems emphasize the autonomy of farms and the improvement of their competitiveness by maintaining or increasing economic profitability, improving the added value of production and reducing energy, water and fertilizer consumption, phytopharmaceutical products and veterinary medicinal products, in particular antibiotics. They are based on biological interactions and the use of ecosystem services and natural resource potentials, particularly water resources, biodiversity, photosynthesis, soils and air, maintaining their capacity to renew the ecosystem, qualitative and quantitative point of view. They contribute to mitigation and adaptation to the effects of climate change.

The Law invites economic and environmental stakeholders to join forces and manage resources at a landscape level in cross-sector groups called *Groupements d'intérêt économique et environnemental*. The

Ministry of Agriculture provides support via education and research and grants for collective projects by groups of farmers (Pesticide Action Network, 2016). Furthermore, the Law makes a change in land policy, protecting farmland from competing land uses and facilitating the uptake of agriculture by youth. Both these aims are achieved by reorganizing the regional farmland management bodies (known as SAFERS – Société d'Aménagement Foncier et d'Établissement Rural) which can intervene in land sales to compulsorily purchase farmland that might otherwise be built upon. A local SAFER also helps young farmers to get started in agriculture by assigning them land from its land bank. Major projects and works which take up agricultural land will now have to compensate the losses of agricultural potential by financing projects that help strengthen the agricultural economy of the territory.

In Kenya, the *Agriculture (Farm Forestry) Rules (L.N. 166/2009)* aim “to preserve and sustain the environment in combating climate change and global warming.” Farm forestry is defined as the practice of managing trees on farms whether individually in rows, lines, boundaries or in woodlots or private forests. The objective and purpose of the Rules is to promote the establishment and sustainable management of farm forestry, for the purposes of: conserving water, soil and biodiversity; protecting riverbanks, shorelines, riparian and wetland areas; sustainable production of wood, charcoal and non-wood products; providing fruits and fodder; and carbon sequestration and other environmental services. To achieve these goals, the Rules determine that every person who owns or occupies agricultural land shall establish and maintain a minimum of 10 percent of the land under farm forestry which may include trees on soil conservation structures or rangeland and cropland in any suitable configurations. The Rules also have provisions on the protection of land prone to degradation and seedling production plans.

Another example is Brazil's (Rio Grande do Sul) *Law No. 14 486 creating the State Policy on Organic Production and Agroecology (2014)*. It declares that the Law is guided by the principles of sustainable development, which include participation; ecological conservation coupled with social inclusion; food security and sovereignty; socioeconomic, gender and ethnic equity; and agricultural, biological, territorial landscape and

cultural diversity. Agroecology is defined as an

ecologically based agricultural system, based on diversified and complex productive strategies, using ecologically sustainable practices and management of natural resources, and is characterized by the non-use of agrochemicals and the use of practices, technologies and inputs that do not cause adverse environmental impacts.

It refers to ‘agroecological transition’ as the

gradual process of conversion of an agricultural system towards an agroecological paradigm, in which ecologically sustainable practices and management as well as environmentally sound technologies are incorporated, in accordance with the principles, guidelines and norms of agroecology and organic agriculture.

In this text, agroecology and organic production are considered two sides of the same coin. The Law stipulates that agroecological systems qualify for payment schemes for environmental services rendered by farmers.

Fertilizer legislation and climate change

The importance of fertilizers for agriculture has always been significant. Together with water, nitrogen is the most important determinant of crop yields to the point that approximately 50 percent of food production worldwide depends on nitrogen fertilizer, while the other 50 percent depends on nitrogen found in soil, animal manure, the tissues of nitrogen fixing plants, crop residues, wastes and compost. (FAO, 2016c). Nations around the world began introducing legislation regulating their production and use as early as the end of the nineteenth century. Usually, fertilizer legislation covers issues such as its manufacture, importation and sale, as well as environmental pollution aspects of fertilizer use (FAO, 1973). This is particularly relevant for climate change, as fertilizer use is one of the relevant sources of GHG emissions from agriculture (FAO, 2016c), and nutrient management is a key policy goal for climate change mitigation as mentioned before.

The control of the various types of fertilizers offered on the national market is normally achieved either by requiring the registration of the

product with a government service (usually the Ministry of Agriculture), or by establishing a comprehensive list of registered fertilizers and restricting production and sales to articles contained in that list. The setting of standards of composition, as well as the requirement of a license for fertilizer manufacturers or sellers, are control mechanisms that can be used to pursue the objectives of the legislation (FAO, 1973). In this regard, introducing requirements that are related to emissions and pollution from fertilizers (both at production and use levels) can be a way to promote CSA in this field of law. Furthermore, policy options can be adopted to favour techniques that reduce the need for fertilizers, such as crop rotation and crop-livestock-tree integration, among others (FAO, 2016c).

In Germany, the *Fertilizers Ordinance (Düngeverordnung – DüV)* of 2006 is the key command-and-control measure that limits nitrate and phosphate emissions from agriculture. The Ordinance implements the European Union *Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources*, being the core legislation to reduce nitrate emissions from agriculture to water bodies in the European Union. The Ordinance was revised in early 2017, triggered by infringement proceedings initiated against Germany by the European Commission since nitrate concentrations in groundwater bodies and coastal waters in Germany were in part increasing. This piece of legislation consists of different sets of measures, including measures to limit the quantity of applied nutrients (application threshold, nutrient balance) and detailed technical or management specifications (e.g. application techniques). The former are ‘goal oriented regulations’, which allow farmers the choice amongst different abatement options to comply, whereas the latter are ‘means-oriented regulations’, which define a precise measure to adopt. The 2017 revision included considerable changes, among others: compulsory fertilizer planning, the inclusion of biogas digestate from plant origin in the organic nitrogen application threshold, a new methodology to calculate an obligatory nitrogen and phosphate balance, a reduction of legal nutrient balance surpluses, stricter blocking periods for fertilizer application in autumn, a stepwise introduction of reduced ammonia emission application techniques and the possibility

to introduce additional measures in pollution hot spots (Kuhn, 2017). This type of legislation is an example of regulatory control of agriculture issues which also serves climate goals.

Legislation on plant health and management of pests

Research indicates that up to 40 percent of the world's food supply is already being lost to pests, and as climatic environments continue to change, farm and landscape management practices will need to be adapted immediately to respond to intensified and/or new pest threats. Climate change is also directly and indirectly influencing the distribution and severity of crop pests, including invasive species, which is further affecting crop production, with evidence suggesting that pest problems overall are likely to become more unpredictable and larger in amplitude. If changing climatic factors are examined in isolation, the following impacts on pests can be indicated:

- changing precipitation patterns (excessive or insufficient) can have substantial effects on crop–pest interactions. For example, warm and humid conditions favour the reproduction of many species, including plant pathogens, while crops suffering from water stress are more vulnerable to damage by pests;
- increases in temperature can augment the severity of diseases caused by pathogens, and can also reduce the effectiveness of pesticides; pest populations often increase as temperatures rise, which can lead to increased applications of pesticides and fungicides, with negative external effects on the environment and human health;
- increasing carbon dioxide (CO₂) levels also stimulate the occurrence of pests;
- extreme weather events can influence the interaction between crops and pests unpredictably, potentially resulting in the failure of some crop protection strategies; droughts can reduce populations of beneficial insects, while strong air currents in storms can transport disease agents (and insect pests) from

overwintering areas to areas where they can cause further problems.

(GACSA, 2017)

Therefore, management of threats presented by pests should be an integral part of climate change responses in agriculture. Government policies and regulatory instruments are again key to enable appropriate planning for climate change adaptation and mitigation, as well as the effective creation and targeting of resources and funds for 'climate smart pest management'. Relevant regulatory issues include:

- the registration and control of agro-inputs and the monitoring of their quality as soon as they are available on the market;
- development of public policies and regulatory instruments such as incentive-based systems that reward climate smart pest management practices (e.g. food labels, taxes, subsidies) to incentivize and reward/penalize farmers who adopt/do not adopt climate smart pest management practices (e.g. subsidizing climate smart crop rotations, taxing the use of highly hazardous agrochemicals);
- the monitoring/regulation of agro-input suppliers and the spreading of climate literacy to increase knowledge of reliable climate smart pest management techniques (especially in developing countries, where agro-input suppliers are the primary source of information for many farmers due to the lack of formal extension systems);
- the establishing or strengthening of access to financial mechanisms, including climate insurance, crop insurance, access to micro-credit, etc., to increase farmers' capacity to invest in farm and/or landscape-level changes in their production systems;
- the creation of national special funds for the development and implementation of local adaptation plans that include climate smart pest management.

(GACSA, 2017)

Furthermore, due to the potential of international agricultural trade of increasing pathways for the geographical distribution of pests, diseases or food-borne pathogens, it is imperative for countries to establish efficient sanitary and phytosanitary (SPS) systems. Pests, diseases and food-borne pathogens particularly are affected by anthropogenic climate change and the epidemiology of these organisms may change considerably. Therefore, surveillance of plant health and monitoring systems are vital at national, regional and international level. Likewise, strengthening infrastructures at national level also includes improving SPS relevant border point infrastructures as well as investing in diagnostic capabilities (Lopian, 2018).

In Serbia, the *Law on Plant Health (2009)* regulates the protection and promotion of plant health. It includes measures for preventing the introduction of harmful organisms, their detection, preventing their spread, and efforts for their suppression, as well as on phytosanitary control overall. The Law creates a general Programme of Measures for the Protection of Plant Health, as well as Specific Programmes for the Protection of Plant Health, in the event of a requirement to implement urgent phytosanitary measures. It also provides for a system of constant supervision and application of phytosanitary measures aimed at preventing the introduction of harmful organisms into the territory of the Republic, their detection, prevention of their spread, and their suppression. Special phytosanitary examinations for the purpose of detecting specific harmful organisms on plants, plant products and regulated objects may be determined by the responsible minister.

Box 4.5
Integrated Pest Management:
an important approach for Climate Smart Agriculture

Integrated Pest Management (IPM) is an ecosystem approach to crop production and protection that combines different management strategies and practices to grow healthy crops and minimize the use of pesticides. FAO defines IPM as “the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. The IPM approach emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms. FAO promotes IPM as the preferred approach to crop protection and regards it as a pillar of both sustainable intensification of crop production and pesticide risk reduction.”

Source: Integrated Pest Management (FAO, 2020h).

Pesticide legislation is generally a specific field of law in most countries around the world. The main objective of pesticide legislation is to protect the environment as well as human health from the risks associated with pesticides, including their effects on crops, livestock and water bodies. Furthermore, it is recommended that pesticide legislation provides for a single framework for the management of all types of pesticides, and for the whole life cycle of such products, from their manufacture, registration prior to their availability on the market, licenses for activities such as sale and use, right down to their disposal. Instruments such as the *International Code of Conduct on Pesticide Management* and the *Guidelines on Pesticide Legislation (FAO/WHO)* provide important guidance on drafting and reviewing pesticide legislation and on compliance with the international frameworks applicable to the subject.

The Canadian Province of British Columbia first passed the *Integrated Pest Management Act* ([SBC 2003] Chapter 58, revised 2015) in 2003,

with subsequent amendments, the last of which dates 2015 with new requirements that came into effect on 1 July 2016. The Act sets out the requirements for the use and sale of pesticides based on a holistic approach that promotes prevention, as well as environmental impact assessments. The Act defines IPM as a process for managing pest populations that includes the following elements: a) planning and managing ecosystems to prevent organisms from becoming pests; b) identifying pest problems and potential pest problems; c) monitoring populations of pests and beneficial organisms, damage caused by pests and environmental conditions; d) using injury thresholds in making treatment decisions; e) suppressing pest populations to acceptable levels using strategies based on considerations of: i) biological, physical, cultural, mechanical, behavioural and chemical controls in appropriate combinations; and ii) environmental and human health protection; f) evaluating the effectiveness of pest management treatments. The *Integrated Pest Management Regulation (B.C. Reg. 604/2004, revised 2008)* implements the Act and deals, inter alia, with the following matters: classes of pesticides, exclusion from the definition of “pesticide”, licences, certificates, permits, permit applications, pesticide use notice, licences.

The preceding legal instruments require a proactive and preventative approach for IPM, promoting a reduction of the reliance on pesticides. The Act and Regulation also require the use of IPM for pesticide use across a very broad scope of locations, including on public land, private land used for forestry and for the purpose of landscaping; and for all pest control service companies. The instruments also establish conditions for the sale and use of pesticides through a pesticide classification system, and regulatory provisions and standards for licenses, certification, permits, and confirmations of pesticide use notices under Pest Management Plans.

Legislation related to water management in crop production

Climate change might result in water scarcity and shortages in its availability, posing serious threats to agriculture. Reversely, since agriculture is one of the main sectors with regards to water usage, this requires appropriate regulation. Among the different challenges

recognized in this field is the situation where farmers enjoy the benefits of irrigation services yet are not made accountable for the environmental and social costs linked to any unsustainable use or pollution of surface and groundwater. In such a situation, government oversight through regulation is needed (GACSA, 2018).

The Global Alliance for Climate-Smart Agriculture (GACSA) under the auspices of FAO and other organizations has produced a *Compendium on Climate-Smart Irrigation (CSI)*, which develops the concept of CSI as an integral part of CSA. The CSI approach aims to increase the productivity and incomes from irrigated crop system value chains and at the same time prevent negative impacts on the environment or on other water users and uses (in space and time). The Compendium highlights that as competition for water resources increases and the demand for good quality water outstrips supply, the regulation and management of water demand becomes increasingly important in order to ensure the sustainability of the system. Several factors are cited as important in this regard, such as institutional mandates for designing and operating regulatory systems, as well as the adoption of different regulatory instruments according to each specific context, such as economic incentives, command and control regulations, encouraging water conservation, self-regulation, and indirect management. At the same time, the Compendium recognizes that regulating the water use of large numbers of farmers is complex, with few examples to date of successful regulation of groundwater use for irrigation (GACSA, 2018).

A report from 2013, *Legislation on Use of Water in Agriculture*, summarized legislation concerning the use of water for agriculture in nineteen countries in Latin America, the Middle East and Central Asia. The report surveyed issues such as water ownership, water governance, requirements for licenses to use water for agriculture, and relevant guidelines on conservation and quality. Water licensing for agriculture use appears to be a promising regulatory tool to promote more sustainable and climate friendly practices. The report shows that in a number of the surveyed countries, water is used under licenses issued by water system administrators. Often, the types of licenses issued depended on the intended use of the water, ranging from licenses for

commercial and industrial purposes, licenses for irrigation projects, hydroelectric generation and industrial, commercial and agricultural activities, or licenses for drilling (The Law Library of Congress, 2013).

An example of the regulation of water usage in agriculture, is Brazil's *Law No. 12 787 on National Irrigation Policy (2013)*, which concurrently aims to support sustainable use and climate friendly practices. The Law provides that 'irrigated agriculture', which includes cattle raising, must be guided by principles such as the sustainable use and management of land and water resources for irrigation; and integration of the National Irrigation Policy with specific policies on water, environment, energy, environmental sanitation, rural credit and insurance; and their respective plans, with priority given to projects whose activities allow multiple uses of water resources. Furthermore, the Law states that the objectives of the irrigation policy are to, among others, encourage the expansion of irrigated areas and increase productivity in an environmentally sustainable way; to reduce climate risks inherent in agricultural activities, especially in areas subject to low or irregular rainfall distribution; and to contribute to the supply of the domestic market of food, fiber and renewable energy, as well as to generate agricultural surpluses for export. Irrigation projects can only be implemented under an 'environmental license' and the use of water resources for irrigation projects depends on the prior approval of the right to use water resources by the appropriate federal, state, or district entity.

Overall, water is expected to become an increasingly scarce resource globally, and more so in areas historically affected by water scarcity, as is the case in many parts of the developing world. Climate change is expected to exacerbate further the availability of water both for domestic and industrial use, as well as for agriculture. It will be important for states to adopt integrated management of water resources that considers the protection of legitimate water users' rights independently and in the context of land tenure systems.

Seed legislation and climate change

In a context of climate change, it is important to ensure that farmers have access to adequate seeds of diverse and well-adapted crops and

their varieties, and legislation can facilitate this process. The primary purpose of seed policies, laws and regulations is to provide assurance of the quality and varietal identity of seeds and planting materials. Seed legislation usually aims to protect farmers as consumers of seeds, providing forms of inspection and testing procedures which aim to assure seed quality and the presence of specific characteristics and performance. Seeds legislation also aims to support seed producers and vendors by establishing governance mechanisms for the sector, which typically include the enforcement of fair competition. Seed legislation usually contains provisions for variety registration, where a variety's performance is assessed and its characteristics described before it can be entered onto a list of varieties eligible for commercial production and sale. In addition, seed legislation regulates the quality of seeds and provides a system for assuring its quality in terms of genetic purity (true-to-type), analytical purity (freedom from contamination) and germination. The most common system for seed quality control is certification, where a neutral third party inspects seed production, and certifies the varietal identity and quality of the seed lots produced for sale, as shown in a recent review by the Commission on Genetic Resources for Food and Agriculture (CGRFA) of seed legislation frameworks in 94 countries (CGRFA, 2018).

In order to integrate climate related goals into seed legislation, crop diversity can be promoted directly, or farmers' access to crops and varieties that have already been tested and approved in other countries can be facilitated. This can be done, for example, by allowing the use of a variety authorized for a similar agroecology in a neighbouring country, without requiring additional years of testing in each country. Legislation may also promote access to diversity for relatively neglected crops, for instance by recognizing different seed quality standards in order to foster a seed sector that is more diverse in terms of the types of enterprises involved, crops multiplied, and seed prices.

The CGRFA review used the following parameters, which have been identified as relevant to on-farm diversity of plant genetic resources (and therefore for climate adaptation purposes):

- the scope of the seed legislation;

- the need for varieties to be registered prior to their commercialization;
- the existence of a seed quality control system;
- representation of farmers in the governing bodies of national seed authorities.

The review found that notwithstanding clear tendencies towards global harmonization, seed laws vary widely. Many factors need to be considered to influence the design of legislation in this field, most prominent of which are the underlying public policy goals. The findings of the review is therefore instrumental to countries wishing to undertake legislative action in this field.

The Mexican State of Nayarit's *Ley para el desarrollo agrícola sustentable del Estado de Nayarit (2012)* notes that sustainability and the rational use of natural resources is the guiding principle for agricultural production. Specific initiatives under the Law include, for example, the promotion of improved and certified seeds and other inputs that augment productivity while protecting the environment. Another example is Ecuador's *Organic Law of Agrobiodiversity, Seeds and Promotion of Sustainable Agriculture (No. 10 of 2017)*, which calls upon the competent agricultural authority to coordinate with the environmental authority, local authorities and research institutions to provide assistance and training to farmers to recover systems of seed production and agrobiodiversity in case of natural disasters or owing to other effects of climate change. For this and other conservation and production objectives, the Law establishes a national germplasm bank comprising landraces/farmers' varieties, *ex situ* germplasm and *in vitro* culture, among other types of germplasm. The authorities are to carry out programmes for research, development and innovation in the area of seeds and germplasm.

In Kenya, the *Crops Act (No. 16 of 2013)* aims to support the growth and development of agriculture in general, to enhance productivity and incomes of farmers and the rural population, and to improve investment in efficiency of agribusiness and to develop agricultural crops as export crops that will augment foreign exchange earnings. Under the Act, the relevant authority is to "advise the government on the introduction, safe

transfer, handling and use of genetically modified species of plants and organisms in the country”, and

establish experimental stations and seed farms for the development of varieties suitable to the agro-climatic conditions of the area and markets that will provide greatest value added to scheduled crops.

Legislation on agricultural biotechnology and climate change

Biotechnology refers to “any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use” (FAO, 2011c). To date, most crops developed through recombinant deoxyribonucleic acid (DNA) technology have been engineered to be tolerant of various herbicides or to be pest resistant through having a pesticide genetically engineered into the plant organism, though other traits are still being developed (Cowan, 2015). Agricultural biotechnologies are being applied to an increasing extent in crops, livestock, forestry, fisheries, aquaculture and agro-industries as a means to adapt to climate change and to maintain the natural resource base.

FAO recognizes that when appropriately integrated with other technologies for the production of food, agricultural products and services, biotechnology can be of significant assistance. Agricultural technologies can play a role in, for instance, providing new varieties and traits that help farmers to increase productivity and to adapt to climate change by including traits that confer tolerance to drought and heat, tolerance to salinity, and early maturation to shorten the growing season and reduce farmers’ exposure to risk of extreme weather events, as well as to pests (FAO, 2020i).

Legislation plays a central role in managing the development of such technologies, as well as in establishing safeguards related to human and environmental health and safety. In fact, biotechnology law is considered a rapidly-growing, highly specialized field of law, closely associated with pharmaceutical law and with a strong grounding in science and technology. This area of law does overlap with some other legal areas: intellectual property law; patent law (and specifically,

patent prosecution); licensing law; litigation; business law; and venture capital law (FAO, 2020i). FAO recognizes that intellectual property rights (IPR) and biosafety, summarized below, are two important areas for biotechnology:

1. IPR over biotechnological products (e.g. plant varieties) and processes (e.g. techniques used in generating plant varieties or in selecting livestock) can influence the application of biotechnology to food and agriculture. While IPR are crucial to the growth of the biotechnology industry, and the lack of IPR protection in a country can limit access to the results of biotechnology originating elsewhere, the fact that many new technologies are held by the private sector raises concern over the impact of current IPR regimes for the delivery of public goods in agricultural research.
2. Biosafety measures are used to control potential risks associated with the release, use and transboundary movement of genetically modified organisms.

An example of legislation in this area comes from Kenya's *Biosafety Act (No. 2 of 2009)*. It has a threefold objective: i) to facilitate research into, and minimize the risks posed by, genetically modified organisms (GMOs); ii) to ensure an adequate level of protection for safe transfer, handling and use of GMOs that may have an adverse effect on human health and the environment; and iii) to establish a process for reviewing and making decisions on the transfer, handling and use of GMOs and related activities. A National Biosafety Authority is established by the Act with a mandate to exercise general supervision and control over GMOs. Among other things, the Authority is to establish and maintain a biosafety clearing house to serve as a means through which information is made available, facilitate the exchange of scientific, technical, environmental and legal information on, and experience with, GMOs. Any activity related to GMOs (e.g. use, introduction in the environment, import or export) depends on approval of the Authority and the Act prescribes the procedures therefor. Of note, the Authority is under a duty to mainstream climate change, as mandated by the *Climate Change Act (No. 11 of 2016)* (explored in Chapter 3). This Act requires that each state department and national

government public entity shall have, among others, the duty to integrate the climate change action plan into sectoral strategies and action plans and in other implementation projections for the assigned legislative and policy functions. This means that the National Biosafety Authority must mainstream climate change in implementing its biosafety mandate under the *Biosafety Act*, and that policies in this area are to be informed and respond to eventual climate change considerations and goals as included in the National Climate Change Action Plan.

4.3.3. Legislation on livestock and climate change

As mentioned, livestock production contributes significantly to emissions of GHG, both in terms of methane emissions from livestock and emissions from land use change due to the conversion of forestland to pasture land. Accordingly, several countries mention climate change mitigation measures in their NDCs. FAO studies indicate several practices that are key to reduce such emissions, usually related to the efficiency with which producers use natural resources, highlighting interventions based on technologies and practices that improve production efficiency at animal and herd levels. These include the use of better quality feed and feed balancing to lower enteric and manure emissions; the improvement of breeding and animal health to reduce herd overheads and related emissions; manure management practices that ensure the recovery and recycling of nutrients and energy contained in manure; improvements in energy use efficiency along supply chains; sourcing low emission intensity inputs (feed and energy in particular); and grassland carbon sequestration, which offset emissions, among others (Gerber *et al.*, 2013).

In addition to these technical interventions, Gerber *et al.* (2013) also suggests the following governance related measures that can be adopted:

- financial incentives, including ‘beneficiary pays’ mechanisms (abatement subsidies) or ‘polluter pays’ mechanisms (emissions tax, tradable permits), as these are economically efficient mechanisms for incentivizing the adoption of mitigation technologies/practices;

- regulations assigning mitigation targets for farmers/sectors, as well as more prescriptive approaches such as mandating the use of specific mitigation technologies and practices;
- market instruments, including to increase the flow of information about the emissions associated with different livestock commodities (e.g. labelling schemes), which can help consumers and producers to better align their consumption and production preferences with the emission profiles of these commodities;
- regulations to prevent land use clearing, as efficiency improvements might lead to production expansion and further land clearance for pasture or crop production; such regulations could prevent land use clearing, helping to safeguard against cases where improvements in production efficiency might encourage deforestation;
- a system of licenses is one of the basic regulatory tools available for the introduction of production criteria, which can also include sustainability/climate related criteria, based on stated policy safeguards to avoid negative environmental (e.g. soil and water pollution from animal wastes), animal welfare and disease side effects, where productivity improvements lead to land intensification (i.e. a move towards greater animal confinement and importation of higher energy feeds). One example of such a policy safeguard is the European Union's *Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control)* which, among other things, requires producers to obtain a permit to establish piggeries with more than 750 breeding sows. It also requires producers to comply with environmental criteria such as treatment of waste, distance to settlements and water flows, and ammonia emissions;
- animal health legislation is another area of law that could integrate regulatory issues such as the maximum concentration of animals in a given space, requirements for animal housing, which could include sequestration of enteric fermentation emissions, as well as requirements on feed materials and practices;

- early warning systems and insurance mechanisms, including index-based insurance plans to assist rural communities in managing the risks of climate variability, is considered a potentially effective preventative option for adaptation in the livestock sector (FAO, 2017d).

These areas of law offer potential legislative avenues to regulate the promotion of the policy goals highlighted here, helping to steer the livestock sector towards more climate-friendly practices, while also bearing in mind its importance for the economy and food security and nutrition.

In the Lao People's Democratic Republic, the *Law No. 03/NA on Livestock Production and Veterinary Matters (2008, as amended in 2016)* defines the principles, rules and regulations related to the organization, management and inspection of livestock production and veterinary activities. Of note, the Law's goal is to guarantee food security and ensure standards to safeguard consumers, while ensuring sustainable environmental protection. Several measures are included to operationalize these goals, which are also relevant to achieve the goals of climate change adaptation and mitigation in the livestock sector, as outlined in the preceding parts of this subsection. The activity of livestock production is to be carried out without negative impacts on society or on the environment. The Law also lays down general principles to guide implementation, among which is the requirement that administration, management and inspection practices of livestock production and veterinary activities and the expansion of these practices shall be developed in harmony with sustainable agriculture and forestry production and environmental protection (i.e. the effective use of animals, conservation of land fertility, clean water resources, ecological equilibrium, etc.). The Law contains regulations on issues such as license requirements to conduct business in livestock production, which could provide a regulatory entry point for environmental requirements. The Law has also set provisions on animal feed production, which is an important contributor to GHG emissions from the livestock sector. The Law determines that individuals, families or entities that intend to conduct business involved in animal feed production must comply with various technical standards and prevent

adverse impacts on society and on the environment. Such a provision may be a regulatory entry point for the inclusion of requirements and/or incentives for the development of less GHG-intensive feeds – often such requirements are developed through secondary legislation, depending on the country context.

There are also examples of legislation that already include climate change among the goals of livestock production. The Mexican State of Tabasco's *Ley de desarrollo pecuario del Estado de Tabasco (2011)*, includes among its objectives the establishment of guidelines and policies for the promotion, improvement and protection of livestock activities and the promotion of sustainable use of natural resources, and the reduction of factors that contribute to climate change. Among the specific provisions in this regard is the mandate of the state authority to regulate livestock activity based on provisions established by the competent bodies related to territorial planning, conservation of natural resources, protected natural areas, and climate change. Furthermore, authorities are mandated to plan and take measures to address weather contingencies, catastrophic or sanitary conditions that impact upon livestock activity, and to promote the adoption of technological practices that reduce the impact on the environment or contribute to mitigate the effects of climate change. The Law also offers some specific mechanisms, such as support to agro-silvopastoral systems that integrate reforestation programmes that provide shelter, quality forage, and water and soil conservation, as well as the promotion of technology (such as solar panels to capture energy and biodigesters to generate energy).

The Republic of Korea's *Act on the Management and Use of Livestock Excreta (No. 8 010 of 2006, as amended by Act No. 13 526 of 2015)*, mandates the Minister of Agriculture, Food and Rural Affairs to establish a livestock environment management agency to promote the sustainable utilization of livestock excreta. It also creates responsibilities of State and Local Governments to prevent environmental pollution caused by livestock excreta, and to recover livestock excreta by measures such as ascertaining the current status of livestock excreta generated in his/her jurisdiction and installing public disposal facilities. Among other mechanisms, the Act allows the Minister of Agriculture, Food and Rural

Affairs to designate farms as an “environment-friendly livestock farm”, provided that certain conditions are met, such as: density of raised livestock to be maintained in compliance with matters prescribed, as well as improvement of animals’ living conditions; and livestock excreta shall be recovered and shall be fully reinstated in farmland. Farmers may receive support from the Ministry to adopt such practices, such as financial support for the management of livestock pens and livestock excreta. Furthermore, the Law creates responsibilities for farmers to conserve the environment and prevent environmental pollution through their practice of environment-friendly livestock raising and appropriate disposal of excreta.

Finally, the *New Zealand Climate Change Response (Zero Carbon) Amendment Act 2019 (No. 61 of 2019)*, which introduced, among other important measures, a new domestic GHG emissions reduction target for the country that includes a specific target for the reduction of emissions of biogenic methane (i.e. from livestock production) to 24–47 percent below 2017 levels by 2050, including to 10 percent below 2017 levels by 2030.

4.4. Concluding remarks

This Chapter has shed some light on the potential areas of law that countries can consider in order to support the achievement of climate related goals in the agriculture sector. Just as the designing of an appropriate policy or policies to address climate change in agriculture is a complex task, the same is true for developing appropriately designed legislation to support the achievement of such policy goals. Legislation in the agriculture sector is particularly context specific, and the approaches adopted by countries to regulate issues such as crop and livestock production, soils and seeds, vary considerably according to national needs and priorities.

There is no blue blueprint for legislative design and any legal frameworks must always be tailored to national circumstances. However, the issues addressed in this Chapter have provided some guidance and examples that can be used to tailor specific measures to other contexts. Framework legislation might provide a legal basis for climate action in different

sectors of the economy (e.g. including mainstreaming requirements as seen in Chapter 3) but the achievement of the policy goals submitted in a country's NDC may require further legislative action in several areas, whether directly or indirectly related to the agriculture sector.

When willing to develop legislation to promote specific policy approaches, countries should be mindful, firstly, of the enabling conditions that will be conducive to the promotion of CSA. This will mean the promotion of secure tenure rights and the promotion of sustainable land and soils management, developing a well-established DRR/DRM system that includes agriculture, and putting in place financing and incentive mechanisms that support a transition to more climate-friendly agriculture systems. Furthermore, legislation can be instrumental in mainstreaming and including specific climate change related measures within sector specific regulatory frameworks. Targeted measures in areas of law such as fertilizers, irrigation, plant and animal health, and production offer a legal basis for developing CSA approaches. Conversely, where enabling measures are non-existent, these areas of law might offer entry points for climate related goals. Climate smart consumption is another topic where legislation might be relevant, given the need advocated by many to steer dietary preferences away from GHG intensive protein sources (e.g. beef) towards plant or insect based food products in order to fight climate change, but also for public health and biodiversity conservation reasons.

The examples examined here show that indeed many countries around the world have started to include such climate related measures in agriculture sector legislation as part of their efforts to curb climate change. These examples can serve as inspiration and provide lessons for other countries aiming to introduce similar measures in their legislation. It should be noted, nevertheless, that a careful assessment of the current legal and institutional frameworks (including all the relevant legislation for each policy area) should always be the basis upon which an action plan for legal review and drafting can be developed and implemented.

Chapter 5. Legislating for climate change in the forestry sector

5.1. Introduction

As we know, forests are an extremely important resource that contribute to maintaining the natural balance of the Earth's climate, performing functions such as regulation of the water cycle, soil conservation, carbon sequestration and habitat protection (e.g. for pollinators). Yet, deforestation is a leading contributor of GHG emissions which cause climate change (FAO and UNEP, 2020). In 2018, FAO reported that globally, forests absorbed the equivalent of roughly 2 billion tonnes of CO₂ each year (FAO, 2018d). The conservation of forests as well as reforestation and forest restoration are therefore important activities that contribute to climate change mitigation. In a framework of sustainable forest management, these activities will also contribute to strengthening resilience and adaptive capacities to climate-related natural disasters, as well as supporting sustainable agriculture and food security (FAO, 2018d).

Forest ecosystems have intrinsic environmental values, contributing to preserve soil and water, provide shelter and food for wildlife, and a habitat for other species. In addition, the products derived from trees – wood, timber, fruits, fodder, resins, gums, charcoal and dyes – have considerable economic and social value. Thus, conserving forest biodiversity is also important, and together with sustainable forest management, they are increasingly part of the so-called 'ecosystem approach'.

A point that deserves particular attention is the distinction between carbon sinks and reservoirs. According to Article 1 (Para. 7 and Para. 8) of the UNFCCC, the chief difference between the two lies in the fact that reservoirs are able to store carbon through natural processes while sinks are able to remove it from the atmosphere. In Article 4 (Para. 1) it states

that sinks and reservoirs of GHGs are included in biomass (underground and at surface level), forests and oceans as well as other terrestrial, coastal and marine ecosystems. By extension, they also include peatlands and mangroves, paludified forests and woodlands.

Box 5.1
The value of mangroves and peatlands

Mangroves and peatlands provide a range of precious environmental services, yet they have already been negatively impacted by climate change, pollution, and clearing for agriculture and development, and will continue to become increasingly vulnerable to their effects. In addition to storing carbon, forested wetlands and mangrove forests help protect coastal areas from flooding (FAO, 2017d), whereas mangrove loss reduces coastal water quality, biodiversity, eliminates fish and crustacean nursery habitats, and eliminates a major resource for human communities that rely on mangroves for numerous products and services (Gilman et al., 2008). According to the IUCN, damaged peatlands are a major source of GHG emissions, annually releasing almost 6 percent of global anthropogenic CO₂ emissions. Furthermore, CO₂ emissions from drained peatlands are estimated at 1.3 gigatonnes of CO₂ annually and can be a carbon sink in the long term. It is estimated that peatlands contain one third of the world's soil carbon but cover only 3 percent of the global land area. Peatland restoration can therefore bring significant emissions reductions. A focus on options to reduce emissions from peatlands has been high on the international agenda,¹⁸ specifically to reduce the pressure from land development and logging. Such options predominantly involve avoiding the release of new emissions from land use change, improving management practices to reduce emissions from existing production systems and sequestering carbon through improved land use and management (FAO and Wetlands International, 2012).

¹⁸ A Global Peatlands Initiative was launched at COP22 in Marrakech. Its founding members include the Governments of Indonesia, Peru, and the Congo, UN Environment (UNEP), the Ramsar Convention on Wetlands, FAO, the Joint Research Center of the European Commission, Wetlands International, the World Conservation Monitoring Centre of UNEP, GRID-Arendal, the European Space Agency, the World Resources Institute, Greifswald Mire Centre and Satelligence.

Human activities such as deforestation, afforestation, reforestation, and other land-use activities are affecting the way that carbon is stored in the biosphere and released into the atmosphere. Mitigation efforts aim to operate a flow of carbon between different carbon sinks and reservoirs to offset the release of carbon into the atmosphere (IPCC, 2000). According to the IPCC, the most cost-effective mitigation options in forestry are afforestation, sustainable forest management and reducing deforestation (IPCC, 2014b). In order for such options to provide long-term carbon benefits, it is recommended that they be anchored in a legal framework and that they be supported by effective and coordinated laws and regulations.

It is a fact that forests and their resources are a valuable source of income for timber-producing countries. In developing countries, fuelwood accounts for USD 70 000 million and forest industry products for USD 63 000 million, while estimates for developed countries are USD 26 000 million for fuelwood and USD 259 000 million for wood products. Furthermore, forests provide livelihood and shelter to millions of people around the world, be they forest dependent communities like indigenous peoples or other communities that live around forested areas. As such, forests require careful management through good governance, clear land tenure arrangements and cross-sectoral coordination. These are essential components of sustainable forest management, which in turn is a key cornerstone for exports of legally sourced timber and for the conservation of sinks and reservoirs of GHGs. A sustainable forest management approach encompasses many of the activities required to both mitigate and adapt to climate change. Adaptation measures for forests are distinguishable into two broad categories, namely, those that encompass measures aimed at buffering forests from perturbations by increasing their resistance and resilience and those that facilitate ecosystem shift or evolution towards a new desired state that meets altered conditions.

Notwithstanding all the beneficial roles of forests, deforestation and forest degradation are still very real threats in relation to climate change.

According to the IPCC,

the Agriculture, Forestry and Land Use (AFOLU) sector is responsible for just under a quarter (~10–12 Gt CO₂ eq/yr) of anthropogenic GHG emissions, mainly from deforestation and agricultural emissions from livestock, soil and nutrient management” (IPCC, 2014b).

Worldwide, agriculture remains the most significant driver of deforestation, and there is an urgent need to promote more positive interactions between agriculture and forestry (FAO, 2016f).

Unsurprisingly, AFOLU features prominently in NDCs submitted by Parties to the PA, as can be seen in Boxes 5.2 and 5.3:

Box 5.2
Mitigation in nationally determined contributions

- Mitigation in relation to land use, land use change and forestry (LULUCF) is found in 83 percent of countries’ nationally determined contributions (NDC); of these, 89 percent cover agriculture activities and/or LULUCF.
- 8 percent of NDCs include an individual non-greenhouse gas (GHG) target (e.g. increase of forest coverage, renewable energy increase, energy efficiency measures, etc.). For example, China intends to increase its forest stock volume by around 4.5 billion cubic meters from the 2005 level.
- 11 percent (17 out of 157 countries) include a non-GHG target that supports a GHG-target or actions with strategies, including the protection and conservation of existing forest areas or afforestation and reforestation projects.
- 34 NDCs include separate or additional non-GHG targets. Of these, 80 percent aim to increase the share of renewable energy in electricity generation. Twelve of these 34 countries set non-GHG targets in the forest sector.

Box 5.2 (cont.)

- 14 percent of NDCs do not include LULUCF in their (economy-wide or sectoral) GHG reduction targets, but do propose policies and other measures to increase mitigation potential in the area of LULUCF. All of these refer to forests, with a few referring specifically to Reducing Emissions from Deforestation and Forest Degradation (REDD+) as an important policy instrument, including as a market mechanism.
- Reasons cited by countries for excluding agriculture and/or LULUCF from their mitigation strategies include the relative uncertainty and unavailability of data, particularly for LULUCF. A few countries mentioned that they do not yet have the financial, human and/or technical resources to implement policies in these sectors, or that emissions from agriculture and/or LULUCF play a rather marginal role in total national emissions.

Source: FAO, 2016b.

Box 5.3

Adaptation in nationally determined contributions

- Amongst the 131 NDCs which include priority areas for adaptation and/or adaptation actions, 88 percent mention the forestry sector. Of these:
 - 83 percent mention concrete forest adaptation activities;
 - 27 percent refer exclusively to management and restoration of forest ecosystems;
 - 9 percent refer exclusively to mangroves.
- Countries often refer to sustainable forest management (SFM) practices that combine multiple targets, e.g. the health of forest ecosystems, the preservation of forests as carbon sinks and the sustainable access to non-wood forest products.
- Several countries plan to use regulatory instruments to support adaptation in the forestry sector. This includes designing and/or implementing laws for sustainable timber-harvesting, forest governance and land use planning.

Box 5.3 (cont.)

This approach is particularly common among countries in the Latin America and Caribbean region, as well as in North Africa and western Asia.

- Many countries advocate an ecosystem approach focusing on restoring degraded ecosystems and/or including specific measures like landscape/watershed and fire management.
- Some countries have established or intend to establish protected areas. The importance of protecting forests for water management and coastal zone protection is highlighted in some NDCs.
- Plans and projects regarding afforestation, reforestation and avoiding deforestation are mentioned by 34 percent as strategies for adapting to climate change.
- A few countries mention the sustainable supply and utilization of wood fuel, including cooking stoves. One fifth of the countries in each region refer to these measures, with several of them highlighting synergies with mitigation. Supporting community-based climate change adaptation and the possibility of combining social, economic and environmental development through, for example, Payment for Environmental Service (PES) schemes, is mentioned by few countries.

Source: FAO, 2016b.

As can be seen from the information in Boxes 5.2 and 5.3, defining and implementing actions in the forestry sector is an essential step in the achievement of most countries' NDCs and, by extension, of the goals of the PA. The policy goals mentioned in the two boxes require appropriately designed laws and institutional frameworks to support their achievement, by determining rights, obligations and applicable procedures. It is important to set out effective coordination mechanisms between policies, laws and regulations on forests, agriculture, food, land use, and rural development (FAO, 2016f). Equally important are clear legal frameworks governing land-use and land tenure that are guided by the principles contained in the VGGT, whose primary objective is to

improve tenure governance for the benefit of all, with an emphasis on vulnerable and marginalized people. Where large-scale commercial agriculture is the principal driver of land-use change, effective regulation of such change, with appropriate social and environmental safeguards, is needed. In this regard, guidance is contained in the *Principles for Responsible Investment in Agriculture and Food Systems (CFS-RAI)*.

This Chapter explores a range of legal mechanisms, legislative options and participatory approaches that can be used by states to support the enormous potential contributions of the forestry sector to the achievement of climate change goals. Beginning with an overview of the relevant international framework and the specific obligations and guidance that emanate therefrom, the Chapter looks at specific areas of legislation, together with examples of climate related measures and case studies. It should be noted that, unlike in the previous Chapter 4 on Agriculture, this Chapter will address mitigation- and adaptation-related measures separately, although it is understood that the two should go, as with other sectors, hand in hand.

5.2. International legal frameworks governing forests and forestry

Much like the agriculture sector, the forestry sector is currently lacking a comprehensive and legally-binding international agreement. Some international bodies have provided definitions for the term “forest” that are based on land use and tree cover. FAO defines the term ‘forest’ as

land spanning more than 0.5 hectares with trees higher than 5 metres and a canopy cover of more than 10 percent, or trees being able to reach these thresholds *in situ*. It does not include land that is predominantly under agricultural or urban land use (FAO, 2012b, p. 3).

This definition includes both natural forests and forest plantations as well as forests that are used for production, protection and conservation purposes. It excludes land with a combined cover of shrubs, bushes and trees, which instead falls under the definition of ‘wooded land’. The UNFCCC defined a ‘forest’, for the purposes of the first commitment

period under the Kyoto Protocol (KP), as comprising

a single minimum tree crown cover value of between 10 and 30 per cent, a single minimum land area value of between 0.05 and 1 hectare and a single minimum tree height value of between 2 and 5 metres (Decision 16/CMP.1).

A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30 per cent or tree height of 2-5 metres are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest" (UNFCCC, 2002, p. 5). There have been different definitions over time, and can still evolve, which highlights the fact that while definitions are based on scientific data, forests have a certain degree of political significance. Although they regularly come under criticism for being too restrictive or inadequately framed, such definitions are a common denominator that allows countries sufficient flexibility to progressively meet their international commitments in relation to forests.

Notwithstanding the lack of a universal definition,, there are a number of internationally agreed instruments containing guiding principles of relevance for this sector. Notably, the UN Conference on Environment and Development at the 1992 UN Earth Summit adopted the '*Forest Principles*', a set of non-legally-binding principles that represent the "first global consensus on forests", with the aim "to contribute to the management, conservation and sustainable development of forests and to provide for their multiple and complementary functions and uses" (UN, 1992, Preamble (b)). This instrument, which, as stated by the United Nations General Assembly in 1992, contains an authoritative statement of principles reflecting a global consensus on the management, conservation and sustainable development of all types of forests (UN, 1992, Annex III), is the closest instrument yet to an international agreement on forests. The Forest Principles echo the UNFCCC in highlighting the role of forests as carbon sinks and reservoirs, yet they fall short of providing a definition of the constitutive elements of forests. Principle 3 states that

National policies and strategies should provide a framework for increased efforts, including the development and strengthening of institutions and programmes for the management, conservation and sustainable development of forests and forest lands (UN, 1992).

Additionally, Chapter 11 of *Agenda 21*, adopted during the UN Conference on Environment and Development at the 1992 UN Earth Summit focused, *inter alia*, on combating deforestation. In 2000, the United Nations Forum on Forests (UNFF) was created as a subsidiary body of the Economic and Social Council (ECOSOC) of the United Nations to encourage political commitment for action of all UN Members on the management, conservation and sustainable development of all types of forests. The UNFF has since adopted resolutions on the sustainable development of forests, notably the 2007 *Non-legally binding instrument on all types of forests*, renamed the *United Nations Forest Instrument (UNFI)* in 2016. The UNFI has a threefold aim: a) to strengthen political commitment and action at all levels to implement SFM and achieve shared global objectives on forests; b) enhance the contribution of forests to the achievement of the internationally agreed development goals (now the SDGs); and c) provide a framework for national action and international cooperation. Good governance at all levels is expressed in the UNFI as an important principle.

In addition, the UNFI contains a set of “Global objectives on forests”, which represent priority policy areas, as well as a set of “Recommendations for action at national level”, which stress, among other issues, that states should

review and, as needed, improve forest-related legislation, strengthen forest law enforcement and promote good governance at all levels in order to support sustainable forest management, to create an enabling environment for forest investment and to combat and eradicate illegal practices, in accordance with national legislation, in the forest and other related sectors.

ECOSOC has urged member states to utilize UNFI as an integrated framework for national action and international cooperation for implementing sustainable forest management (SFM) and forest-related aspects of the post-2015 development agenda, as noted in the *International arrangement on forests beyond 2015*. These instruments emphasize the need to manage forests while promoting the three pillars of sustainable

development (social, economic and environmental aspects), i.e. not only by setting production-oriented goals but also by promoting the sharing of social benefits, all in an environmentally sustainable way.

In 2015, the 2030 Agenda and the SDGs clearly established the links between agriculture, forests, climate change, gender equality and food security. Under SDG 2, Target 2.4, countries have committed to make food production systems sustainable and resilient to climate change by 2030. This is to be achieved by implementing resilient agricultural practices that *inter alia* increase productivity, help maintain ecosystems, strengthen capacity for adaptation to climate change and progressively improve land and soil quality. This shift is all the more important in tropical and subtropical countries where large-scale commercial agriculture and subsistence agriculture accounted for 73 percent of deforestation in the years 2000–2010. These figures do not however account for some significant regional variations: in Latin America, commercial agriculture accounts for almost 70 percent of deforestation, whereas in Africa where small-scale agriculture is more significant, it accounts for one-third of deforestation (FAO, 2017). For 2015 figures, the World Bank DataBank shows a one percent decline in the total forest coverage worldwide since the 1990's, making up 30.8 percent of the total land area.

The VGGT, which were explored in more detail in Chapter 4, contain internationally agreed guidance on the recognition and protection of forest tenure rights. Additionally, the VGGT provide guiding elements on issues such as tenure rights of forest-dependent people, including indigenous peoples, which is seen as fundamental for securing livelihoods in forest communities. In many countries with significant forest cover, forests are often managed by the state. Furthermore, the VGGT promote improved forest governance through effective law enforcement, reduced corruption and greater transparency, which can promote SFM and reduce unauthorized activities (such as illegal logging) that lead to deforestation and forest degradation and exacerbate the causes of climate change.

The International Tropical Timber Organization's (ITTO) *Criteria and indicators for the sustainable management of tropical forests* are considered to be one of the most important guiding policy instruments on SFM. They provide essential components of SFM and indicators on

ways of assessing those components. The ITTO first developed criteria and indicators for tropical forests in the early 1990s and these have since been revised several times, the latest version dating from 2016 (ITTO, 2016). Other relevant international instruments in this area include the *Bonn Challenge* on forest and landscape restoration, and the *New York Declaration on Forests*. In addition, relevant incentive instruments and processes at the international level include the aforementioned REDD+ programme and the FAO-EU Forest Law Enforcement, Governance and Trade (FLEGT) Programme,¹⁹ both of which are further discussed later.

Turning to legally-binding international instruments, both the UNFCCC and the UNCCD acknowledge the role of forests as carbon sinks and reservoirs and make a clear link between SFM in the fight against land degradation and desertification. Article 8, Paragraph 3(b) of the UNCCD encourages Parties to include forest conservation measures in their National Action Plans. The PA is the latest of a number of global instruments that commit Parties to take measures that directly affect the management of forest resources. Article 5, Paragraph 1 of the PA anchors the Agreement firmly within the broader international framework by referring to the conservation of sinks and GHG reservoirs. This reference is closely related to the objectives of the CBD, the UNCCD and the *Ramsar Convention on Wetlands of International Importance, Especially as Waterfowl Habitat* of 1971. Additionally, Article 5, Paragraph 2 of the PA endorses the guidance and decisions previously adopted by the UNFCCC COP relating to REDD+, and provides a platform for their continued implementation.

While the CBD does not contain any direct reference to forests, Article 2 states that biological diversity includes terrestrial, marine and aquatic living organisms, which by extension includes trees, forests and mangroves. Moreover, forests have been given prominence over time

¹⁹ For more information on FLEGT, see <http://www.fao.org/europeanunion/eu-projects/eu-fao-forest-law-enforcement-governance-and-trade-flegt-programme/en>.

through a number of CBD COP decisions²⁰ and in the CBD Programme of Work. The CBD's Aichi Biodiversity Targets state that

by 2020, the rate of loss of all natural habitats, including forests, should at least be halved and, where feasible, brought close to zero (Target 5) and that areas under agriculture and forestry should be managed sustainably, ensuring biodiversity conservation (Target 7) (FAO, 2016f, p. 29).

These targets will also need to be translated into Parties' NBSAPs, and thus part of national action in the forest arena.²¹

Other international binding agreements should be considered in relation to forests and biodiversity, such as the *Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)* of 1973, the *Ramsar Convention on Wetlands* of 1971, the *Convention Concerning the Protection of the World Cultural and Natural Heritage* of 1972, the *International Tropical Timber Agreement (ITTA)* of 1994 and the *International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)* of 2001.

There are also a number of regional initiatives that have led to the adoption of regional instruments regarding forests. For instance, the *Central American Convention for the Protection of the Environment* of 1989 and the subsequent creation of the Central American Commission for Environment and Development, led to the creation of the Central American Inter-Parliamentary Commission on Environment. This body, consisting of Members of Parliament from the seven Central American Countries, has been instrumental in advocating for a *Convention for the Conservation of the Biodiversity and the Protection of Priority Wilderness Areas in Central America*, which was eventually signed in June 1992. In all effects, this is a regional forest convention. To improve SFM in Central America, the Lepaterique Process was also initiated following the recommendations of an Expert Meeting on Criteria and Indicators

²⁰ See in particular, COP 2 Decision II/9; COP 6 Decision VI/22; COP 7 Decision VII/1; and COP 10 Decision X/36.

²¹ It should be noted that the CBD Strategic Plan was to be updated for the next decade at the COP 2020 in Beijing, China, which was cancelled due to the Covid-19 virus.

for Sustainable Forest Management organized by the Council for Forest Protected Areas in collaboration with FAO in 1997.

Remaining with Central America, we also note the *Regional Convention for the management and conservation of the natural forest ecosystems and the development of forest plantations* of October 1993 and the *Regional Convention on Climate Change* of October 1993. Other initiatives are also relevant, such as the Mesoamerican Biological Corridor project which began in 1997 and the Central American Forestry Strategy adopted in October 2002.

5.3. An enabling legal framework for sustainable forest management

Good governance is reflected in the concept of ‘sustainable forest management’, which FAO refers to as a “dynamic and evolving concept, which aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations.” “Forests and trees, when sustainably managed, make vital contributions both to people and the planet, bolstering livelihoods, providing clean air and water, conserving biodiversity and responding to climate change” (FAO, 2020k).

The scope of the forestry sector’s contribution to achieving climate change goals through SFM will be largely dependent upon the ability of the underlying national policy, the legal and institutional framework to regulate people’s rights to access, use, and manage natural resources in a manner that protects and respects tenure rights, gives access to information and to participatory processes, as well as to effective legal remedies. Appropriate policy, legal and institutional frameworks can be instrumental in achieving SFM, for example, clear, equitable laws on forest resource tenure and access, coupled with effective law enforcement. Good forest governance may include empowering and budgeting appropriately for police and courts to better detect and punish illegal activities; cross-border collaboration and information-sharing; and providing forest users with adequate access to information on how to comply with legal

requirements.²² Forest policies and laws should also be consistent with those of other sectors (particularly land and agriculture but also others such as mining and infrastructure) as competition between different uses of land is a significant driver of forest degradation and deforestation, and deficiencies in governance and in upholding the rule of law have been shown to undermine the implementation of SFM (FAO, 2020k).

FAO has long-standing experience in supporting states and their forestry sectors. The FAO Forestry Paper 161 on *Developing effective forest policy* (FAO, 2010a) deserves special mention in the context of this Study. This guidance paper indicates that effective forest policy sets out a government's vision and/or goals related to forest management and that national policy should outline specific objectives on a number of topics, including the multiple uses of forest land (e.g. commercial timber production, recreation and tourism, biodiversity protection, non-wood forest products, animal husbandry, agroforestry and environmental services such as water supply, erosion control, climate regulation and carbon sequestration). Other frequent policy elements include: protecting and enhancing the extent and quality of the resource for the benefit of citizens and future generations, including productive capacity, health and vitality; ensuring that extraction of forest products is sustainable and in accordance with laws and regulations, whether formal/ written or informal/traditional; maintaining or enhancing the ecosystem services provided by forests; and managing forest resources to produce the range and mix of goods and services demanded by society, contributing directly to national development.

Overall, the most frequently addressed issues in national forest policy are components of the seven thematic elements of SFM are:

1. extent of forest resources;
2. forest biological diversity;
3. forest health and vitality;

²² See for example the Sustainable Forest Management Partnership in Ghana under the FAO-EU FLEGT Programme. Available at: <http://www.fao.org/in-action/rights-and-compensation-for-forest-communities-in-ghana/en/>

4. productive functions of forest resources;
5. protective functions of forest resources;
6. socio-economic functions of forests;
7. the legal, policy and institutional framework.

Countries will also often focus on more specific topics such as land tenure, land use, climate change, employment, community forestry, and forest industry.

A forest policy will not usually specify in detail the instruments or practices to implement it. Legislation, on the other hand, plays a critical role in clarifying rights, obligations and procedures, supporting implementation of forest policy goals. This can be done both through primary legislation (parliamentary-level) and secondary legislation (e.g. regulations, decrees, ordinances and by-laws). Legislation can prohibit certain types of conduct, provide for sanctions and provide a solid and long-term anchor for action in the face of political changes in government. In this regard, forest policies and legislation are complementary tools, as legislation translates policy goals into actionable rights (FAO, 2020k).

Notwithstanding the challenges in providing universally-applicable guidance on the content and coverage of forestry sector legislation, given the significant variations between countries, not only in the nature, importance and role of forest resources, but also in their legal and institutional settings, there are a number of recognized good practices and trends that can be highlighted and considered by countries (Christy *et al.*, 2007).

- Clear and secure tenure is increasingly seen as key to SFM. However, property rights in forests are often complex and a source of contention. Forests may be state-owned, privately owned or be the common property of local communities or other groups. There may also be a discrepancy between what formal law prescribes and what is seen as legitimate on the ground, as customary law is often found to play a strong role *de facto* even where a state has formal property rights. Recent years have seen

particular attention being paid to balancing heavily state-centric forest laws with customary tenure regimes or to enhance the rights of access, control, and management of local communities. The private sector also has a role to play, as a stakeholder often involved in forest land negotiations.

- While environmental protection has traditionally been an element of forestry laws, both in its emphasis on conserving forests and their natural character, as well as in accounting for environmental impacts, this was normally within the framework of forests as a productive asset. In recent years, forest legislation has seen the inclusion of two specific environmental issues; biodiversity and climate change. The former is being mainstreamed to a certain extent in national laws as a value to be protected in forest management. The latter is translating into increasing references to the importance of GHG mitigation as an objective of forest law and policy, though there is still little legislation containing specific provisions for mitigating forest-based climate-change (Christy *et al.*, 2007).
- Attempts to curb the rate of conversion of forest lands into other land uses, a recognized major cause of deforestation and emissions causing climate change, can result in the imposition of higher thresholds for such conversions than for decisions to designate forest areas. Higher thresholds may take the form of the need to obtain approval from a different branch of government (for example, a legislature or the chief executive) or, in a federal or decentralized system, approval from central government. Another measure is to require the meeting of the 'no net loss of forest land' standard, so that any conversion to non-forest use must be accompanied by equivalent afforestation or forest classification activities elsewhere. Finally, we have seen the use of Environmental Impact Assessment-type procedures to scrutinize the environmental consequences of any proposed forest conversion (Christy *et al.*, 2007).
- Forest management, while a traditional core subject of forest law, has also seen the emergence of new trends. Planning issues are

taking into account ecological and social issues, including public participation. New legal techniques have also begun to emerge to support a more transparent and responsible allocation, pricing and monitoring of forest concessions and licenses.

FAO's 2016 report on the *State of the World's Forests (SOFO)* highlighted the relationship between land-use change and agriculture (FAO, 2016f). The report showed that sustainable management of both forests and agriculture, and their integration into overall land-use plans, is essential for achieving broader policy goals such as tackling climate change and the SDGs. A large proportion of deforestation is driven by conversion of land for agriculture and it is no coincidence that this is recognized and addressed both in the 2030 Agenda on Sustainable Development and in the PA. Signatory countries to such agreements will need to ensure that sufficient emphasis is given to land-use change in their national policies and in the implementation of existing policies in this area.

The 2016 SOFO report contains a chapter dedicated to forest governance and management and contains key conclusions and recommendations, including the following:

- Although most countries have formal policies covering their forest and agriculture sectors, there is an increasing need for policies on land-use change that integrate both forestry and agriculture, especially in light of the SDGs and the PA.
- Complexities in the governance of land-use change could be reduced with better coordination between policies on forests, agriculture, food, land use, rural development, water and climate change, including cross-sectoral priorities or strategic targets for land-use change, along with appropriate institutional arrangements.
- Legal frameworks for the conversion of forest to agricultural land are often complex, and informal local practices may have a strong influence where implementation and law enforcement is weak. The role of customary law is key for vulnerable groups.

- Integrated land-use planning is important for creating a strategic framework to balance competing land uses among stakeholders, including government agencies, local communities, civil society organizations, and the private-sector.
- An analysis of various legal frameworks showed the importance of formally recognizing traditional rights based on customary tenure, especially for vulnerable and forest-dependent people.
- The legal framework analysis also provided information on legal provisions for the conversion of forest to agriculture, and implementation challenges. Social and environmental safeguards should be in place in any scheme aiming to incentivize investments.
- The institutional framework should include civil-society and private-sector organizations, as well as government bodies.

The recently published SOFO 2020 highlights that the conservation and sustainable use of forests and their resources are key to the conservation of the world's biodiversity, as forests are integral to biodiversity. An integrated management approach is even more important given the increased severity of the multiple environmental challenges faced by the world now, most prominent of which is climate change (FAO and UNEP, 2020).

The following sections of this Chapter take a closer look at some of the important elements for the development of an enabling legal and institutional framework for SFM and climate change action in the forestry sector. Many of these elements have already been analysed in the context of agriculture in Chapter 4, but they are also presented here due to their specific relevance for the forestry sector.

5.3.1. Institutional frameworks

Effective and well coordinated institutions are critical for good forest management and sustainable development more broadly. Though other types of institutions might have a role in SFM, public bodies and institutions have the mandate to maintain and enhance the common goods provided by forests; hence public bodies are essential. Institutional

functions typically encompass regulation (e.g. regulating the use of public forests through law enforcement and taxation), management (e.g. planning, inventorying and mapping) and facilitation (e.g. by providing extension services and guidance, and supervising forest management). Public institutions may also conduct research and training, thereby generating knowledge and trained personnel for the implementation of SFM. These functions become even more relevant given that about 73 percent of forests are under public ownership globally (FAO, 2020l), although this proportion is decreasing globally. Even when public forest lands are leased to private companies or communities (for example through concessions), FAO considers that public bodies still play key roles in the design, allocation and enforcement of concession contracts, and in providing information and mediating disputes (FAO, 2020k).

The critical roles that forests and trees play in mitigation and adaptation to climate change are now well recognized. However, integrating climate change strategies within core forestry activities is challenging for forest agencies in their efforts to achieve SFM. A recent example of legislation that includes climate change in the mandate of forestry authorities is the *Forestry and Land Management (Scotland) Act 2018 (asp 8)*. The Act put the Members of the Scottish Parliament under a duty to promote SFM and to prepare a forest strategy that considers this goal. In preparing or revising the forestry strategy, the Members must, among other issues, have regard to the land-use strategy prepared pursuant to the United Kingdom of Great Britain and Northern Ireland's *Climate Change Act 2008 (Chapter 27)*, as well as to Article 2 of the *Kyoto Protocol to the UNFCCC* (which refers to the binding mitigation targets of Annex I countries, including Scotland).

FAO points out that forest agencies must become more flexible, responsive, and dynamic so as to be able to respond to society's growing expectations from forests and forestry. They also need to allocate appropriate budgeting and ensure that qualified staff is in place at the central and local levels. This organizational adaptation means that they should embrace new areas of work and a new work environment, utilizing continuous learning, innovation and strategic alliances to enhance their performance. In particular, trends toward decentralization

will require forest agencies to adapt to a style of governance that is more closely aligned with the principles of stakeholder participation and collaboration. Effective institutional adaptation also requires, in almost all countries, an enhanced ability to develop and implement policies related to climate change and REDD+. These comprehensive approaches demand unprecedented action and resources to create new institutional structures and the strengthening of existing ones. Currently, however, only a few forestry organizations are prepared to undertake this burgeoning task (FAO, 2020k).

International commitments to combat climate change are also drivers of institutional change such as the PA, potential results-based actions and incentives coming from the REDD+ process, the institution of carbon markets, bio-energy, eco-tourism and national forest programme development. At a broader level, contemporary forestry requires upward integration of forest management with national economic development policies and programmes, synchronizing forestry with sustainable development programmes, developing effective public-private partnerships, and actively engaging forest dwellers and local communities in forest policy implementation at the grass-root level (FAO, 2020k).

As an example, the *Sustainable Forest Development Act (R.S.Q., c. A-18.1 of 2010)* of Canada (Quebec), recognizes the importance of establishing a “forest management model that (...) takes into account the impact of climate change on the forest”. Among other measures, the Act assigns responsibility for promoting sustainable development of forests, forest management and forest planning to the province’s Minister of Forests, Wildlife and Parks. In exercising such functions, Forest Planning Development Units are created, to facilitate forest planning including through regional and local consultations leading to the creation of integrated forest development plans and special forest development plans. The Minister draws up a tactical plan and an operational plan for integrated forest development for each Development Unit, in collaboration with the local integrated land and resource management panel set up for the Unit. Such plans contain, among others, the “allowable

cuts” assigned to the Unit (which must take climate change impacts into account).

Gathering and disseminating information and data regarding the status of GHG emissions from the forestry sector is a key function that institutional mandates can include. Complete, reliable and accurate data, aside from being required under international reporting requirements, is important to inform policy directions to mitigate climate change. The Republic of Korea’s *Act on the Management and Improvement of Carbon Sinks (Act No. 11 360 of 2012, as amended by Act No. 14 270 of 2016)* gives the Minister of the Korea Forest Service the mandate to formulate, every five years, a comprehensive plan for the improvement of carbon sinks. These plans must include, among other issues, information and statistics regarding GHGs in the forestry sector. Furthermore, the Act mandates the Minister to compile detailed information and statistics related to carbon sinks. These include outcomes from activities focused on afforestation, forest management, distribution and use of harvested wood products, energy in the timber industry, use of forest biomass energy, and the prevention of deforestation and forest degradation.

Public institutions should not only be effectively designed and resourced, they also need to work in coordination with each other so as to produce optimal results. Policy-level integration (e.g. mainstreaming climate change considerations into a sectoral law) is but one level of coordination. Public bodies responsible for areas such as land, agriculture, the environment, mining, infrastructure and energy sectors need to be involved in a coordinated and inclusive decision-making process and their respective mandates should be clearly defined and distinguished to avoid gaps and overlaps in oversight of forests and forest activities. This should extend to all levels of governance, i.e. central, regional and local.

An example of legislation setting out different institutional mandates for climate change action (including GHG accounting and intersectoral coordination) for forestry institutions is Korea’s *Framework Act on Low Carbon, Green Growth (Act No. 9 931 of 2010, as amended by Act No. 14 122 of 2016)* (see Chapter 2).

An implementing provision of the above Act, the *Enforcement Decree of the Framework Act on Low Carbon and Green Growth (Presidential Decree No. 22 124 of 2010)*, provides for the Minister of the Office for Government Policy Coordination to organize and operate a consultative body comprised of public officials who are members of central administrative agencies. These include the officials from the following ministries: Strategy and Finance; Interior and Safety; Agriculture, Food and Rural Affairs; Trade; Industry and Energy; Environment; Land, Infrastructure and Transport; Oceans and Fisheries; and the Korea Forest Service. The Decree sets out the responsibility of each ministry in relation to climate change. It further specifies that the Ministry of Agriculture, Food and Rural Affairs is responsible for submitting detailed data on information and statistics on GHGs in the forestry sector. The Decree also establishes the coordination mechanisms for climate change action at the various levels of governance. At the regional level, the Special Metropolitan City Mayor, each Metropolitan City Mayor, each decentralized-level Governor, or the Governor of each Special Self-Governing Province must collaborate to establish a regional implementation plan for green growth which must reflect the priorities and capacities for implementation of the local governments within their jurisdiction. The Ministry of the Environment is tasked with issuing guidelines to facilitate the harmonization between regional implementation plans and the national climate strategy.

In relation to the above, we would point out that new and evolving new and evolving international initiatives, such as the ones emerging under the UNFCCC, are often perceived as leading to the creation of additional layers of commitments and work that are best handled by creating new and specialized institutions. However, while these bodies provide visibility to the related initiative and can act as a catalyst for climate action, it has been noted that they tend to work within a silo, with overall increased costs and bureaucracy. Newly created bodies may also find it harder to establish themselves within the existing institutional landscape. In practice, this can limit the scope of their action and negatively affect the implementation of a climate change national strategy. To the extent possible therefore, it is considered best practice to provide for the integration of climate change initiatives by building

upon and reinforcing existing institutional frameworks and allocating resources through existing channels.

5.3.2. A land-use plan

Typically, a land-use plan (LUP), or land-use policy or simply a land policy, offers a framework for the management of land and the environment and related resource allocation and institutional set up and coordination. Such plans will also establish any relevant cross-sectoral linkages that can be used to promote objectives in related sectors. In many countries, land-based activities are an important contributor to rural livelihoods and to the national economy as a whole. At the same time, agriculture, mining, forestry, energy, infrastructure, tourism, industry, and recreation, will fall under different legal regimes and institutions that regulate the allocation of rights and responsibilities within these activities. In particular, the responsibility for managing these activities and their associated land uses and land-use changes often falls under different government departments, which can lead to lack of efficiency and to uncertainty. A national land-use plan, can help map out these activities, clarify the rights and obligations of the different actors within and across sectors, allocate resources, and ensure institutional coordination.

In contrast, the absence of a clearly defined LUP can lead to competition for natural resources. Uncoordinated policy and legal frameworks exacerbate these problems, leading to uncoordinated land-use practices and overlapping or conflicting tenure arrangements. In this context, informal tenure rights holders and vulnerable groups are likely to lose out in favour of larger economic interests. In the forestry sector, the absence of a national land-use plan makes it difficult to keep track of the various forest tenure rights in a country and this renders them vulnerable to competing interests from other sectors of activity, such as mining and agriculture (FAO, 2017j). The lack of an adequate LUP is an impediment to the effective tackling of illegal forest conversion and illegal logging, which reduces the capacity of forests to act as carbon sinks and reservoirs.

An LUP (at national or sub-national level) can promote sustainable land-use management and help preserve forest resources and carbon sinks. They are also an appropriate tool within which to cater for customary and indigenous tenure rights. Other benefits include increasing accountability and providing a sound basis for the resolution of tenure-related disputes. These are all elements that contribute to the improvement of livelihoods and food security and are considered to be prerequisites for the successful implementation of climate strategies. Of note, countries often establish an LUP via a piece of legislation, which gives it greater legal force.

To be effective, the LUP should be developed in a participatory manner to protect the legitimate tenure rights of those who could be affected by the plan. To this end, a mapping of existing legitimate tenure rights, both formal and informal, is useful. International human rights instruments provide safeguards for women and indigenous people and grant them the right to be heard in decision making. Article 15(1) of the International Labour Organization's *Indigenous and Tribal Peoples Convention, 1989 (No. 169)* grants them rights to the natural resources pertaining to their lands, including the right to participate in their use, management and conservation. Governments are to consult the peoples concerned – through appropriate procedures – whenever they might be affected by legislative or administrative measures (Article 6.1.a). Such consultations should be carried out in good faith and with the objective of achieving agreement or consent to the proposed measures (Article 6.2). Similarly, the 189 Parties to the *Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW)* are to take all appropriate measures to eliminate discrimination against women and ensure that they have the right to participate in the elaboration and implementation of development planning at all levels, equally with men (Article 14.2.a). An example of legislation adopted against discrimination is the United Republic of Tanzania's *Land Use Planning Act (No. 6 of 2007)*, described in Chapter 4.

5.3.3. Forest tenure

According to the VGGT, the concept of forest tenure is used to refer to the rules that determine access, use and control over forest resources. These rules may be formal (enshrined in statutory law) or informal (not recognized by statutory law) and the product of custom. Sometimes customary tenure is recognized by the legal framework and becomes part of the general legal framework for forest tenure. The recognition of legitimate tenure rights that are not currently protected by the law contributes to the clarification of rights and obligations in relation to forests. This, in turn improves the tenure security of forest actors, contributes to transparency in the forestry sector and is an essential component of SFM.

The characteristics of forest tenure in any given country will be a function of its history, legal tradition and internal power dynamics. It is often thought of in binary terms, i.e. modern versus traditional. However, such an approach fails to recognize the myriad of cultural and religious differences within any given territory that together form a system and characterize a legal landscape within a single territory. Such systems will follow practices gained over the centuries and which often define a group's identity. International law, such as the above-mentioned *Indigenous and Tribal Peoples Convention, 1989 (No. 169)*, recognizes these systems as legitimate and encourages states to grant protection to the right to such lands, territories and resources. However, while these systems may be legitimate, they are not necessarily afforded the same degree, if any, of protection by most legal frameworks. The legal recognition of these tenure systems will bring them under the umbrella of the general legal framework which can provide additional rights and guarantees to communities as a whole, and to their individual members.

The governance of tenure is a crucial element in determining how individuals, communities and businesses acquire rights to forest resources under the law and in practice. Weak governance systems will have negative consequences on social stability, economic growth and sustainable natural resource management. Therefore, SFM and the achievement of climate goals are highly dependent on the capacity of the

legal, institutional and judicial frameworks to ensure equitable access to forest land and resources, to protect against the arbitrary loss of tenure rights, and to provide for transparent, accountable and participatory decision-making processes.

Tenure rights to forests refer to a bundle of rights that determine access, use and control over land, forests, and forest resources. In the context of REDD+, they also determine who benefits from carbon sequestration. They are primarily determined by laws and regulations which will set out the obligations, responsibilities and restraints that are associated with these rights. The legal and regulatory framework will determine who is allowed to use what resources, in what way, for how long, under what conditions, and whether or not rights can be transferred (alienated) to others. In addition, the recognition and allocation of tenure rights to land and forests should not infringe or extinguish legitimate tenure rights that are not currently protected by the law. The VGGTs provide guidance and information on internationally-agreed practices that can be used when developing strategies, policies, laws, programmes, including national land use planning. As mentioned in the VGGT, a mapping exercise of all existing tenure rights can be the starting point for a process of legal recognition of informal tenure systems to the effect of bringing them under the umbrella of the general legal framework and such a process should be supported by transparent, fair, affordable and independent dispute resolution mechanisms.

The system governing forest tenure will typically be found in a range of forest-related legislation going beyond a main forest law (or similar instrument governing the forestry sector). National constitutions provide a foundation for determining forest tenure rights, as they recognize the fundamental rights, freedoms and obligations that apply to individuals and communities across a country. FAO's Gender and Land Right's Database shows that most constitutions will guarantee equality before the law and access to justice, protect against the arbitrary loss of property and prohibit gender-based discrimination (FAO, 2020m). Constitutions also provide important information as to the sources of law that apply in the country, the hierarchy of norms and what will happen in the event of conflict. Many countries experience a situation of

legal pluralism where customary law and/or religious law operate either within the general legal system (such as Sierra Leone and Kenya) or alongside it (such as Gabon). When customary or religious law operate within the general legal system, the Constitution has recognized them as a valid source of law in the country. It is important to acknowledge however that not all customary tenure systems are recognized by the law, which often creates a situation of legal uncertainty for those whose rights could be considered “legitimate”. If the law fails to recognize and protect legitimate tenure rights, countries should initiate a process to provide legal recognition to these rights (VGGT, Section 4.5).

Beyond national constitutions, international human rights instruments ratified by countries are another source for the protection of legitimate tenure rights of forests (VGGT, Section 4.8). The *International Covenant on Economic, Social and Cultural Rights (ICESCR)* for instance, recognizes the right to an adequate standard of living and the right to adequate food (Article 11), for which forest resources can be important elements. The CEDAW recognizes the equal right of women and men to enjoy legal capacity (Article 15) and to administer property (Article 16). The *Indigenous and Tribal Peoples Convention, 1989 (No. 169)* recognizes their right to retain their own customs and institutions, where these are not incompatible with fundamental rights defined by the national legal system and with internationally recognized human rights (Article 8).

A clear definition of land, forest and tree tenure is important for the achievement of SFM and for the successful implementation of climate change adaptation and mitigation measures. The law should also clarify who has ownership rights to forest carbon and who is able to trade it as this will be an important factor in the generation of forest carbon projects (FAO, 2017d).²³

5.3.4. Economic incentives and financing for sustainable forest management

There is increasing recognition of the importance of providing financing and other economic incentives to support and compensate the activities

²³ For examples of forest carbon tenure legislation, refer to FAO, 2012c.

involved in SFM and for the value of the natural resources contained in forests (which include carbon but also ‘environmental services’ such as water sources, soil preservation, etc). Offering economic incentives and financing for stakeholders is an important way to promote SFM, enabling mechanisms that render the preservation and sustainable use of forest resources more attractive than their degradation and overexploitation, or even conversion of forest land to other uses. These can include financing mechanisms (e.g. a national forest fund that supports protected areas), market based incentives (e.g. carbon trading), or tax incentives, among others.

Payment for Ecosystem Services

Article 5 of the PA states that Parties should take action to conserve and enhance sinks and reservoirs of GHGs, including forests. The Article also encourages actions to implement and support these goals, including through results-based payments, and gives a treaty-based legal anchor for the *Warsaw Framework for REDD+*, adopted by seven COP decisions at the UNFCCC COP 19. This section will focus on payment for ecosystem services, as an example of results-based payments, as well as on carbon finance. The REDD+ and FLEGT frameworks will be further addressed later.

Payment for ecosystem services (PES) is one of the promising mechanisms that rewards the conservation of natural resources, as was explored in more detail in Chapter 4 (Agriculture). Here, we provide an example of PES, focusing on the forestry sector.

Costa Rica’s PES programme is one of the best known examples of this kind of mechanism. It was created through the *Law No. 7 575 — Forest Law*, adopted in 1996. This Law recognizes four environmental services provided by forest ecosystems: 1) climate change mitigation; 2) watershed protection; 3) biodiversity protection; and 4) landscape beauty. Several institutions are entrusted with the management of the PES programme to ensure that these services are protected, including the National System of Protected Areas and the National Forest Financing Fund, which was established as a decentralized body of the forestry

administration to handle financial issues for forests and natural resources. The implementing regulation of the Law provides that the Government may enter into multi-year contracts with landowners for reforestation, sustainable forest management and forest protection. On average, landowners receive USD 63/hectare/year for forest conservation, USD 41/hectare/year for forest regeneration, USD 816 over five years for reforestation, and USD 1.3/tree for agroforestry. The bulk of funding for Costa Rica's PES programme derives from a fossil fuel sales tax. Contracts for PES are renewable and the landowners are free to renegotiate or sell their rights to other parties (World Bank, 2008).

Forest carbon markets

Unlocking the potential of forests and land-use management in absorbing and storing carbon for climate change mitigation will require significant financial investment. Markets for carbon offsets are being recognized as a growing mechanism to channel funding towards projects that restore, protect, and manage forests and natural landscapes, and support their ability to store carbon. A carbon offset represents a tonne of carbon dioxide equivalent (CO₂ eq) removed from the atmosphere that balances another tonne emitted into the atmosphere. Offsets have a differential element because their impact is calculated, measured, and typically verified by a third-party (Hamrick and Gallant, 2017).

In the early days of carbon markets, forest carbon offsets were circumscribed to sales through voluntary markets, whereby companies seeking to meet internal emissions reductions goals purchased carbon offsets from projects that use forests or other natural areas to store carbon. More recently, governments began to create national or regional markets for carbon offsets through the use of carbon pricing systems. Some carbon markets are voluntary, where a national, state, or local government organizes (and sometimes regulates) a carbon pricing system but leaves the decision to participate to companies, organizations, and individuals. Compliance markets, on the other hand, are defined as government-mandated taxes on emissions or cap-and-trade programmes that allow trading of carbon offsets. Of note, many of the markets that allow regulated organizations to purchase offsets from forestry and land-

use projects are relatively recent. At the same time, their contribution is significant: recent reports tracking voluntary carbon markets, compliance carbon markets, and REDD+ programmes estimated that resources channeled through such carbon finance mechanisms were around USD 2.8 billion up to 2016 (Hamrick and Gallant, 2017).

The Republic of Korea's *Act on the Management and Improvement of Carbon Sinks (Act No. 11 360 of 2012, as amended by Act No. 14 270 of 2016)*, mentioned previously, is an example of legislation regulating a forest related carbon offset scheme. The Act allows local governments or business entities to use forest carbon stock obtained from activities such as afforestation, SFM and reduced deforestation, among others, as offset outcomes. The Act gives the Minister of the Korea Forest Service the mandate to create the infrastructure for such a forest carbon offset in order to utilize forest carbon stocks. The local governments or business entities who are obligated to reduce GHG emissions under any Act or Regulation, can use the forest carbon stock to offset their required GHG emissions reduction target. The Act contains the prerequisites of the functioning of the scheme, which is also further detailed in secondary legislation.

5.3.5. Disaster risk management and reduction in forestry

Climate change is already affecting the growth of trees, the frequency and intensity of forest fires and the incidence of forest pests, and it could increase damage caused to forests by extreme weather conditions such as drought, floods and storms (FAO, 2013b). As mentioned, disaster risk reduction (DRR) is the concept and practice of systematic efforts to analyse and reduce the causal factors of disasters such as the ones caused by climate change in the forestry sector. Examples include limiting exposure to hazards, lessening the vulnerability of people and property, wise management of land and the environment, and improving preparedness and early warning for adverse events. The *Sendai Framework for Disaster Risk Reduction* invites countries to report on whether they have prepared a National Disaster Risk Reduction Strategy and whether DRR is an integral objective of environment-related policies

and plans. It is reported that 133 countries have developed national DRR strategies, 102 of which indicated that they include ecosystem-based DRR measures that may cover forests (FAO, 2018d).

Indeed, forests' role in managing and reducing the risks from natural disasters is being increasingly recognized, given their role in addressing the impacts of climate change and fostering resilience in developing countries. Forest-based disaster risk management (DRM) solutions can also bring a range of co-benefits, including for fisheries, tourism, carbon storage and biodiversity conservation (PROFOR, 2017a). Forest-based measures include reforestation and rehabilitation of degraded areas, particularly on slopes, through terracing interventions to prevent erosion and landslides, afforestation to mitigate floods, mangrove conservation and restoration in coastal areas to protect against cyclones and tsunamis, and integrated fire and pest management. In addition to concrete plans for measures on the ground, in some countries DRM has been integrated into relevant national environmental and natural resources policies and plans (FAO, 2018d).

Mangroves are a good example of how forests can contribute to DRM. When properly located and maintained, mangrove forests can reduce storm surge, by lessening the energy of waves, and reducing the damage caused by potential coastal flooding, which are common consequences connected to climate change (PROFOR, 2017b). Another area where DRR/DRM is particularly relevant in the forestry sector is prevention and control of forest fires. FAO reports that the risk of fires is increasing under climate change, in association with land-use changes and institutional constraints on sustainable forest and fire management. FAO has coordinated the development of the *Fire Management: Voluntary Guidelines – Principles and Strategic Actions*, which aim to support countries develop an integrated approach to fire management. The Guidelines advise authorities and other stakeholder groups that fire-fighting should be an integral part of a policy applied not only to forests but also across other land-uses on the landscape. FAO recommends that greater attention is paid to monitoring wildfire GHG emissions as a potential contributor to climate change (FAO, 2006).

The Dominican Republic is an example of a country that has established early warning systems (EWS) related to climate change, in accordance with its DRM law. The EWS includes a hydro-meteorological warning system in areas of high-risk in the north-west of the country, a forest fire EWS, and a tsunami EWS managed by the national meteorological office, in cooperation with its counterpart in Puerto Rico (IFRC and UNDP, 2014). Other examples include Canada's (Québec) *Sustainable Forest Development Act (R.S.Q., c. A-18.1 of 2010)* (Section 182) and Viet Nam's *Law on Forest Development and Protection (2004)*, which feature fire monitoring and reporting provisions.

5.4. Integrating climate objectives into forest-related legislation

5.4.1. Forestry aspects of a climate change policy

Having an overarching national climate change policy provides the foundations for an effective response to climate change across different sectors. Such a policy, which may at times be intertwined with an environmental protection policy, reflects national priorities, parameters, underlying principles and objectives on climate change and/or environmental protection at large. Climate change policy can integrate climate change issues into the forestry sector through appropriate planning, decision-making and allocation of resources while also clarifying institutional arrangements, ensuring institutional coordination and anticipating any legislative action that may be needed to implement the policy.

Uganda's forestry instruments (the 2001 National Forestry Policy and the *National Forestry and Tree Planting Act of (No. 8 of 2003)*) make reference to climate change when addressing issues such as commercial forest plantation, forest products processing industries, collaborative forest management, and farm forest conservation of forest biodiversity, watershed management, soil conservation and urban forests. The Uganda National Climate Change Policy (NCCP), issued in 2016, recognizes that despite these efforts, climate change and intensified land use will exacerbate

the already accelerated rates of deforestation, forest degradation and desertification connected to issues such as tree mortality increases with reduced rainfall, and the incidences of pest, diseases and rise in forest fires. Accordingly, the NCCP establishes priority areas for adaptation and mitigation in the forestry sector. These include promoting SFM to allow forests to continue providing environmental services, including mitigating climate change while supporting the sustainable development needs of communities and the country. The NCCP also establishes a National Climate Change Commission, with the status of a National Commission under the Ministry of Water and Environment, to perform the inter-sectoral coordination efforts needed to implement the NCCP.

5.4.2. Integrating climate goals into forestry sector legislation

The relationship between forests and climate change, and the role of SFM in mitigating and adapting to the effects of climate change, is gradually being integrated into forest-related legislation.²⁴ This relationship is sometimes acknowledged in the objectives section of a main forest law (if it exists), or induced by the ratification of multilateral environmental agreements, or inferred from climate-related measures within different instruments of forest-related legislation.

For example, in California, the *Public Resources Code (2011)* declares that it is the policy of the State of California to encourage prudent and responsible forest resource management calculated to serve the public's need for timber and other forest products, while giving consideration to the public's need for watershed protection, fisheries and wildlife, sequestration of carbon dioxide, and recreational opportunities, both for current and future generations. In other countries, the forest law specifically refers to the obligations of the State which derive from its ratification of certain international agreements (Section 4512(c)). Likewise, Article 11 of Bolivian *Ley Forestal (Nº 1 700, 1996)*, specifically requires that the implementation of the national forest plan is done in accordance with the requirements of the ITTO, CBD, UNFCCC and UNCCD.

²⁴ See, in this regard, FAO, 2018e.

5.4.3. Climate change mitigation and the forestry sector

The mitigation objective of the climate change regime is to limit anthropogenic emissions of GHGs and to protect and enhance sinks and reservoirs. The key roles of forests are well recognized by the IPCC and in Article 2, Paragraph 1 of the PA. Under the PA, developed country Parties, are expected to adopt economy-wide emission reduction targets, including in the forestry and agriculture sectors. Developing country Parties have greater flexibility in their mitigation actions and can decide whether to target specific sectors or take a more holistic approach by aiming to reduce emissions across all sectors of the economy.

A broad range of options are available to countries wishing to target emissions from agriculture, forestry and other land uses. These include the prevention of emissions being released into the atmosphere by conserving existing carbon sinks and reservoirs in soils or vegetation, or the capture of carbon dioxide from the atmosphere through sequestration by increasing the size of existing carbon sinks and reservoirs (IPCC, 2014b). Both can be achieved by reducing deforestation, forest degradation, illegal logging and illegal forest conversion, and/or by storing carbon in terrestrial systems, through afforestation and integrated agricultural practices such as agroforestry.

The sections that follow explore the legal and institutional underpinnings of implementing mitigation approaches in the forestry sector.

Reducing emissions from deforestation and forest degradation

Deforestation and forest degradation account for an estimated 17 percent of global GHG emissions (FAO, 2017d). However, the environmental, social and economic value of carbon stocks in forests is increasingly recognized in international and national laws. An example comes from the *Law on the Conservation of Nature No. 14/003 (2014)* in the Democratic Republic of Congo. Article 8 of this Law requires the central, provincial and other decentralized territorial entities to adopt the necessary measures to combat deforestation and forest degradation. The Law provides that the state shall take into account, in developing

the national conservation strategy and the national forest programme, the potential value of forest carbon stocks in climate regulation, and the fair and equitable remuneration of ecosystem services and mitigation measures. The Law also envisions that the modalities of application of such measures will be defined in secondary legislation.

In the Republic of Korea, two pieces of legislation in particular make reference to climate change mitigation through reducing deforestation and forest degradation. The first is the 2012 *Act on the Sustainable Use of Timber (No. 11 429)*. The overall goal of this Act is to cope with climate change and to contribute to improving the quality of life for people and the sound development of the national economy by “increasing the carbon sink function and other diverse functions of timber and using the timber in a sustainable manner”. The Act defines “Timber culture” as “values, knowledge, norms and lifestyle which are common to the members of society who favor and use timber products that realize diverse functions of timber”, and “Timber education” as

an education whose purposes are to educate the public to understand the importance and obtain knowledge of timber and to have sound hierarchy of values by experiencing and learning diverse functions of timber.

The Act recognizes that increasing carbon storage through sustainable use of timber is an essential factor in promoting national health, improving quality of life and coping with climate change. Therefore, the Act mandates the Government to promote the sustainable use of timber by establishing and implementing a series of measures for the promotion of timber culture, vitalization of timber education, and systematic and stable supply of timber products. These measures include the establishment and implementation of five-year plans for sustainable use of timber which, among other things, determine sustainable rations of the use of the product; certifications of timber products; safety evaluations of timber products to prevent harm to humans and the environment in timber production, sale and use; and measures to prevent the distribution or use of timber illegally obtained inside or outside the country.

The second piece of legislation from the Republic of Korea is the 2012 *Act on the Management and Improvement of Carbon Sinks (Act No. 11 360 of*

2012, as amended by Act No. 14 270 of 2016), which aims to respond to climate change by managing and improving the role of forests as carbon sinks. In order to implement the Act, the Minister of the Korea Forest Service is mandated to formulate five-year plans for the improvement of carbon sinks. The Act envisions a series of measures to help improve carbon sinks, which are related to afforestation, forest management, distribution and use of harvested wood products, energy in the timber industry, use of forest biomass energy, and prevention of deforestation and forest degradation.

Another example is Indonesia's *Presidential Instruction No. 5/2019 on Stopping New Permits and Improving Primary Natural Forest and Peatland Governance*, banning the issuance of any new licences for deforestation and ordering a permanent moratorium on issuing new licenses to use land designated as primary natural forest and peatland, in areas designated as conservation forests, protected forests or production forests. The moratorium, which covers around 66 million hectares (254 827 square miles) of primary forest and peatland, was first introduced in 2011 and has been renewed regularly as part of the efforts to reduce emissions from fires caused by deforestation.

The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries – UN-REDD is a joint effort of FAO, UNDP and UNEP to support nationally led REDD+ processes. It promotes the informed and meaningful involvement of all stakeholders, including indigenous peoples and other forest-dependent communities in the implementation of REDD+ activities and programmes (see Box 5.4). Additionally, the Programme supports national REDD+ readiness efforts in 65 partner countries from Africa, Asia-Pacific and Latin America.²⁵

²⁵ For more information, see Voigt and Ferreira, 2015.

Box 5.4

The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries

REDD+ is a mechanism developed by Parties to the United Nations Framework Convention on Climate Change (UNFCCC) which requires Parties to “adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs” (Article 4.2(a)).

It creates a financial value for the carbon stored in forests by offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. Developing countries receive results-based payments for results-based actions. The REDD+ Programme goes beyond deforestation and forest degradation in its approach and includes the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks, through a series of actions including development of legal and/or policy instruments. REDD+ actions may apply to different land-use sectors, in addition to the forestry sector.

Large-scale land use change (which is driven mostly by extensive and intensive agriculture), illegal logging, the conversion of forest for subsistence farming and infrastructure development, all contribute to reduction in forest cover and forest degradation. The social, economic and environmental consequences of deforestation and degradation are well documented and range from the release of carbon dioxide into the atmosphere, to the loss of biodiversity, environmental services and livelihoods. A number of international conventions, programmes and funds aim to unpack the root causes of deforestation and forest degradation to address them.

Voluntary programmes such as REDD+ support the implementation of binding agreements such as the UNFCCC, the PA, the UNCCD and the CBD. These international instruments and programmes are intended to alter the behaviour and forest practices of a range of actors through a mix of regulatory actions and market-based incentives. However, local

communities, forest-dependent communities and indigenous peoples are all right holders whose level of involvement in the implementation of REDD+ will determine the programme's effectiveness in reducing emissions and forest degradation.

REDD+ requires an enabling legal and institutional framework which stretches far beyond the forestry sector. In fact, the implementation of REDD+ has included a phase of "legal preparedness" during which countries under the programme have carried out a review of their forest-related legal frameworks. Many aspects of REDD+, such as benefit-sharing, tenure and national forest monitoring systems, entail legal considerations and have legal implications. Addressing legal gaps or inconsistencies can support efforts to clarify tenure rights, carbon rights, define institutional mandates for National Forests Monitoring Systems, ensure that REDD+ safeguards are addressed and respected, and design effective mechanisms to share benefits, etc. Detecting and preventing overlaps between sectoral laws as well as adding more clarity to legal provisions can also contribute to those efforts (FAO & UNEP, 2016). National legal measures that can be implemented to achieve REDD+ objectives are providing for the creation of national land use plan(s), the clarification and allocation of land and forest tenure rights, and the respect for procedural rights.

Another important feature of REDD+ is the benefit-sharing mechanism which lies at the heart of the Programme's strategy. It requires a system to organize the allocation and distribution of the monetary and non-monetary benefits that the Programme generates. From a legal perspective, this requires that laws and regulations identify who is entitled to the benefits from reducing emissions, under what conditions, in what proportion, and how. Such rights, obligations and criteria may be scattered across a range of sectoral instruments and fall under the responsibility of different ministries. While a land law may organize access, use and ownership of land across the national territory, a forest law may grant specific rights to forest resources, and an agriculture law may regulate the conversion of forest land for agricultural purposes. It is important that appropriate institutional frameworks are in place to ensure that the rights of all stakeholders, i.e. government, communities, individuals and businesses, are upheld.

Defining forest carbon ownership

The mitigation objective, and in particular the implementation of REDD+, has raised the issue of carbon ownership in forests. When the ownership of forests is vested in the state, the law often organizes the allocation of use and management rights to timber producers and local communities through forest concessions. The granting of such rights, however, will not necessarily include rights over the carbon contained in the trees, which has an intrinsic value in the context of combating climate change. Indeed, the ownership of carbon can be separate from the ownership of the land on which the trees grow, and it can also be separate from the ownership of the trees themselves. Carbon rights can be vested in the state who can then redistribute the benefits according to plans and priorities. They can also be allocated to communities, to concessionaires or to the owner of the land on which the trees grow. The definition of carbon rights and their legal regime is a complex issue that many countries are still working to accommodate within their legal frameworks. Importantly, the definition of carbon rights should not exclude legitimate tenure right holders, such as forest communities and indigenous peoples, whose rights may not be formally recognized by the general legal framework (see Section 5.3.3 on forest tenure).²⁶

The *Forest Property Act (2000)* passed by the Government of South Australia incorporates a number of options for the allocation of carbon rights. First, it specifically states that the capacity of forest vegetation to absorb carbon from the atmosphere is a form of property, and constitutes a carbon right. Second, a carbon right in Southern Australia is either attached to the ownership of the forest vegetation, or separated from it, under a forest property agreement. A forest property agreement can take two forms: i) a forest property (vegetation) agreement; and ii) a forest property (carbon rights) agreement. A forest property (vegetation) agreement separates the ownership of forest vegetation from the ownership of the land on which the vegetation is growing, or is to be grown. It transfers the ownership of the forest vegetation from the owner of the land (the transferor) to another (the transferee) without severance

²⁶ For a broader overview, see FAO, 2012c.

of the vegetation from the land. A forest property (carbon rights) agreement separates the ownership of carbon rights from the ownership of the vegetation to which the carbon rights relate by transferring the ownership of the carbon rights from the owner of the vegetation (the transferor) to a third party (the transferee). If the ownership of the land is separated from the ownership of the forest vegetation, then the owner of the land and the owner of the vegetation must both be parties to the agreement. The Act does not make it compulsory for the forest property agreement to be registered but registration is seen as preferable because it clarifies the interests of each party to the agreement and reduces the potential for future conflict over such rights.

Tackling illegal logging

Illegal logging is a major driver of deforestation and forest degradation which contribute to the uncontrolled release of GHG emissions into the atmosphere. The term “illegal logging” is used to refer to logging practices that contravene one or more of the domestic and/or international legal instruments that apply to the timber value chain in a country. Reducing opportunities for illegality and providing incentives to trade in legally-sourced and processed timber contributes to SFM and to climate change mitigation. The legal trade in timber increases the capacity of governments to implement climate goals by providing more control over the modes of production and the volumes of harvested timber. In addition, the trade in legal timber generates government revenues that can be injected into law enforcement and forest management.

The trade in timber can be domestic, but large volumes of timber are exported for international markets. Major timber importing countries are gradually appraising the risks that illegal timber poses on forest resources worldwide and on their own timber sectors. As a result, an increasing number of countries are taking legislative action to prevent illegal timber from entering their markets. Canada's *Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act (1992)*, the amendment to the United States of America's *Lacey Act (1900, as amended in 2008)*, the European Union *Timber Regulation (No. 995/2010)*, Australia's *Illegal Logging Prohibition Regulation (2012)*,

Japan's *Act on Promotion of Use and Distribution of Legally-Harvested Wood and Wood Products (Act No. 48 of 2016)*, and the Republic of Korea's *Act on the Sustainability of Wood (2017)*, are all examples of laws designed to respond to illegal logging and to encourage trade in legal timber. These approaches however, vary considerably and there is still lack of uniformity in defining illegal timber. For example, in Article 1(g), the European Union Regulation defines "illegally harvested" timber as timber harvested in contravention of the applicable legislation in the country of harvest, but the Acts in Canada and the United States of America extend the scope of illegality to timber harvested in contravention of any foreign law.

While it is beyond the scope of this Study to discuss the implications of these approaches, they all face the common challenge of defining the scope of what constitutes "legality". Most of these Acts provide some delineation of what constitutes legal timber in the country of origin, which is generally understood as timber that is imported, exported, transported, sold, received, acquired or purchased in accordance with the laws on authorization, the environment, and taxation. However, other elements may also have an affect and it is important that loggers, operators and compliance officers have a clear and common understanding of the full range of legal instruments that are used nationally to determine the legality of timber.

The elements that make up the legality (or illegality) of timber can be scattered across multiple laws and regulations that apply to the different activities along the timber value chain, beginning with the point of harvest, through transportation, processing and trade, all the way to international export. Each of these steps will typically be governed by a set of laws and regulations that need to be complied with for timber to be deemed legal.

Activities relating to harvesting need to consider the wide range of laws and regulations which determine the rights to access, use, and control land and forest land, by legal and natural persons, including local communities and indigenous peoples. Harvesting rights may be allocated through permits, licences or forest concessions, which are binding

contracts between the state and the producer, and normally entail the approval of a management plan. They regulate the surface area where trees can be felled, the diameter of the trees that can be harvested, and may also place restrictions on the volume of certain species that can be removed. They often place an obligation on the producer to either re-plant and restore the forests, or to pay a reforestation tax to ensure that species are harvested sustainably. Forest management laws, environmental protection laws (including the species listed by CITES), and environmental impact assessment obligations, are all important factors in determining the legality of timber, at the harvesting stage.

The legal instruments governing trade and export activities often require timber vendors to operate under a valid licence or permit.

In addition, there are laws and regulations that apply across all activities within the timber value chain. These include fiscal obligations (such as a stumpage fee, export levies, income tax), health and safety regulations, employment laws, and personal laws, as they determine legal capacity for women and men, as well as laws on gender equality which may contain special measures to strengthen women's access to natural resources, including forests. These are all important aspects in ensuring that the timber value chain is legal.

Legality in the timber value chain is an important contributor to the achievement of climate goals. Therefore, all the issues discussed here are important factors that should be discussed nationally between government and stakeholders, including communities and indigenous peoples, the private sector, and civil society. A participatory approach to decision-making allows actors in the timber value chain to raise concerns, and provides an opportunity to clarify the rights and obligations that apply within the sector and to build consensus around what constitutes legally-produced and traded timber. Whatever the option that countries wish to follow, the definition should be developed in a participatory manner.²⁷

²⁷ For an interesting reference point, see FAO, 2014d.

Box 5.5
European Union Forest Law Enforcement, Governance and Trade –
Voluntary Partnership Agreements

The European Union's Forest Law Enforcement, Governance and Trade – Voluntary Partnership Agreements (FLEGT-VPA) are bilateral trade agreements negotiated between the European Union and timber-exporting countries outside the single market. The objective of a partnership is to ensure that timber and timber products imported into the single market comply with the laws of the exporting country. The approach is unique in that it analyses the entire legal framework governing the timber value chain to identify the laws and regulations that make up a "legality definition". This exercise provides a sound basis to instigate legal reform that will improve coherence and close any legal loopholes that may otherwise be exploited within the timber sector. The VPA process enables national governments, private sector and civil society representatives to reach consensus on the laws and regulations that must be adhered to along the timber value chain for timber to be deemed legal under national law. As of June 2020, there were seven countries with VPAs entered into force (Cameroon, the Central African Republic, the Congo, Ghana, Indonesia, Liberia and Viet Nam), two countries who had agreed to the VPA but still needed to be entered into force (Honduras and French Guyana), and six countries that were in the process of negotiating a VPA (Côte d'Ivoire, the Democratic Republic of the Congo, Gabon, the Lao People's Democratic Republic, Malaysia and Thailand).

The European Union's Forest Law Enforcement, Governance and Trade – Voluntary Partnership Agreements (FLEGT-VPA) process (see Box 5.5) serves to disentangle the elements that make up timber legality, which in turn is useful for strengthening the accountability of public and private actors in the forest and land-use sectors, which in turn is one of the determining factors for the success of climate change mitigation goals.

Disentangling the elements that make up timber legality can be done by bringing together stakeholders in the forestry sector to trigger a review of the legal framework and to identify opportunities for legal reform. As a starting point, the review should cover all relevant policy objectives,

and legal and regulatory instruments that apply to the timber value chain in its entirety, including those that apply to other sectors such as the environment, employment, transport, trade, and taxation. Second, the review should serve to identify any inconsistencies between the legal instruments, within and across these sectors. Inconsistencies and gaps in implementing legislation create situations of legal uncertainty, which are conducive to corruption and conflict, and can affect the legality of the entire value chain. This is an opportunity to discuss appropriate amendments and regulatory steps to remove inconsistencies and draft any missing implementing legislation, such as decrees and regulations. This is also an opportunity to clarify what legal requirements the various actors along the timber value chain need to comply with, to ensure that the timber that is harvested, transported, processed, sold domestically or exported internationally is legal from the point of harvest to the point of export. Compliance officers in the country of origin and in the country of import will be in a stronger position to carry out their enforcement duties against a set of pre-determined legal requirements.

Tackling illegal forest conversion

Illegal forest conversion occurs when forest land is converted to another land use in contravention of any of the legal requirements, obligations and restraints laid out in the laws and regulations or public land-use plans applicable to the land, forest, environmental and agriculture sectors, in particular. This type of conversion not only contributes to deforestation and forest degradation, it also infringes upon the tenure rights of a range of actors in the forestry sector. The illegal conversion of forest land is often a consequence of competition for land with agriculture and mining but it can also be the result of encroachments of forest concessions into protected areas and encroachments on mangroves when they fall under the definition of forest in national legislation, such as in the case of Section 2 in the Gambia's *Forest Act of 1998* and Article 2 in Madagascar's *Loi n°. 97-017 portant révision de la législation forestière (1997)*.

However, it is important to note that the conversion of forest land to other uses may be necessary to accommodate changes in economic, social and environmental needs. Ideally, laws should organize this transfer of status

in such a way as to ensure that other land uses and associated activities do not negatively affect the forestry sector and the environmental services that it provides. Forest conversion should be framed within a national land-use plan and organized through the allocation of permits or licenses. The rules governing forest conversion should determine: i) under what circumstances and felling methods conversion is authorized; ii) any prohibited activity; and iii) the conditions that need to be met for the authorization to be granted.²⁸

The authorization should be subject to environmental and social risk assessments, compliance with mitigation measures, and include restrictions for environmentally-sensitive areas (such as protected areas). In Cameroon, *Law No. 94-01 to lay down Forestry, Wildlife and Fisheries Regulations* of 1994, allows for the conversion of a portion of the Permanent Forested Estate, under certain conditions (FAO, 2017j). The Law states in Article 16, “The clearing of all or part of a State or Council forest is subject to an environmental impact assessment, the total or partial declassification of this forest” and “the classification of an equivalent size of a forest of the same category and in the same ecological zone”, under Article 22 of *Décret N° 95/531/PM du 23 aout 1995 fixant les modalités d’application du régime des forêts*.

²⁸ For a comprehensive guide on this matter, see Clientearth, 2018.

Adaptation and the forestry sector

As we have seen, the PA confirms the importance for Parties to strengthen resilience and to reduce vulnerability to climate change (Article 7.1). Adaptation measures seek to reduce the pressure and risks posed by climate change on communities, and particularly on vulnerable communities. Under the PA, adaptation actions should follow a country-driven, gender-responsive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional knowledge (Article 7.5).

The subsections that follow explore potential approaches, as well as their legal underpinnings, that countries can consider for their adaptation efforts in the forestry sector (as mentioned, some countries already use these approaches).

Community-based Forest Management

In the forestry sector, community-based forest management (CBFM) is increasingly gaining recognition as an effective form of adaptation measure. The CBFM approach refers broadly to the governance of forest land tenure, as well as forest use and governance arrangements under which the rights, responsibilities, and authority for forest management rest partially or fully with local communities of forest users. It is thus a sub-national approach to forest management that empowers communities to control and manage their own resources (Newton *et al.*, 2014). Clarity and security of access of local communities to an array of forest rights are considered vital in reducing deforestation and degradation of rural landscapes. Of special note, the rights to access forest resources and to exclude others, the authority to define or plan land-use patterns and manage natural resources, and the duration and permanence of these rights over time are important elements of the land tenure systems (PROFOR, 2017c). The findings of a report from the World Resources Institute, emphasized that when communities have no or weak legal rights, their forests tend to be vulnerable to deforestation and thus become the source of GHG emissions (Stevens *et al.*, 2014).

On the other hand, legally-recognized forest rights for communities, and government protection of their rights, tend to lower such emissions and deforestation.

An estimated 60 million indigenous people depend on forests for their livelihoods and have a unique knowledge and understanding of forest resources. This traditional knowledge is transmitted from generation to generation and is applied to the management of natural resources (FAO, 2013c). Article 10(c) of the CBD encourages countries to recognize and protect the customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements. Indigenous knowledge is at the heart of community-based adaptation and mitigation mechanisms, which have been shown to generate social and environmental benefits at the local and global levels.

The state has a central role to play in ensuring that the legal recognition of customary tenure systems finds a suitable balance between the protection of traditional identity, customs and culture, and the protection of general rights derived from human rights law. This requires long-term dialogue to enhance the knowledge and understanding on the part of actors in the forestry sector of the range of legal avenues that are available to them under constitutional law, state law and customary law. It is in this spirit that Article 27 of the *United Nations Declaration on the Rights of Indigenous Peoples* (UNDRIP, 2007) encourages states to implement a fair, independent, impartial, open and transparent process to give recognition to indigenous peoples' laws, customs and land tenure systems, with their participation. This recognition however, contains a caveat in Article 34, which provides that indigenous peoples have the right to maintain their distinctive traditions, practices and juridical systems or customs "insofar as they do not violate human rights standards". The ILO *Indigenous and Tribal Peoples Convention, 1989 (No. 169)*, takes a similar approach in Article 8(2).

In addition, community-based forest management finds a legal basis in Article 15 of the ILO *Convention No. 169*, which grants indigenous peoples the right to participate in the use, management and conservation of

natural resources. Similarly, Article 26(2) of the UNDRIP grants them the right to own, use, develop and control the lands, territories and resources that they possess by reason of traditional ownership, occupation or use. The past four decades have seen a growing momentum for local forest management, with the emergence of community-based forestry. The concept covers a range of activities with varying degrees of autonomy in local management rights. They range from participatory conservation – where communities have the responsibility to protect forests in exchange for access and use of forest resources but have little authority to make decisions – to full ownership (FAO, 2016h).

The requirements and application procedure for establishing forest management communities, the extent of the rights conferred under forest management agreements, the forest resources that these rights cover, the sharing of benefits (within communities and with government, depending on the form of community-based forestry [CBF]), and the conditions for terminating the agreement, are all elements that should be laid out in legislation. These rights confer a varying degree of control over forest resources to communities. Joint forest management is a form of CBF where forest resources on state-owned forests and the benefits derived from their sustainable use is shared between government and communities. In other forms of CBF, the management of forest resources may be fully devolved to communities under a management plan, with government oversight. The agreement may confer rights to harvest timber and to sell it (FAO, 2016h). Of note, the definition of “forest resources” is an important element to take into consideration when drafting CBF legislation, as they are often the basis for the allocation of rights to communities under these agreements. The forest resources may include plants, peat, wildlife and trees, their derivatives and sometimes carbon.

In Zambia, *The Forests Act, 2015 (No. 4 of 2015)* creates a framework for two forms of community-based forest management: i) community forest management implemented through community forest management agreements; and ii) joint forest management, implemented through joint forest committees. Under the Act, community forest management is carried out by community forest management groups made up of members of a village located within a forest or neighbouring a forest. The

purpose of community forest management is to confer communal control, use and management of a forest, or part of a forest, to groups of people who depend on it for their livelihood. These groups must first submit an application to the Forestry Department to be recognized formally with the status of a community forest management group. This requires them to meet the condition of proximity, i.e. living within the forest or adjacent to it and to demonstrate that they derive their livelihood from it. The Forestry Department has to provide a decision in writing within 21 days of receiving the application and the decision can be appealed. Once a community forest management group has been recognized and formed, it can then apply to enter into a community forestry agreement. The agreement lists the rights and obligations of the group in relation to forest management. These include, *inter alia*, the obligation to protect, conserve and manage the community forest in accordance with traditional forest user rights, the obligation to cooperate with the Forestry Department in tackling illegal harvesting of forest produce, and an obligation to inform the Forestry Department of any developments and changes within the community forest which are critical for the conservation of biodiversity. The agreement confers user rights over certain forest produces such as the right to harvest timber and to develop community forest wood and non-wood based industries.

Joint forest management is the second form of CBF under *The Forests Act, 2015 (No. 4 of 2015)* in Zambia. It aims to encourage the participation of stakeholders in the sustainable management of forest resources and the sharing of benefits derived from it, through a joint committee which is responsible for the implementation of a management plan. The management plan covers the designation of areas for agroforestry, traditional agriculture and recreation areas, commercial timber production and commercial agriculture, afforestation and reforestation and the requirements for a forest monitoring system and carbon stock assessment, among others. The plan is carried out either in designated joint forest management areas, which can include local forests, botanical reserves, plantations, private forests and open areas, or (based on the recommendation of the Forestry Department) in a local community with the owners/occupiers of a forest area. It requires the consent of the local community or owners of the forest.

Agroforestry

As mentioned in Chapter 4, FAO refers to agroforestry as land with tree cover, that is not forest land and with temporary agricultural crops and/or pastures/animals. It includes agrisilvicultural, silvopastoral and agrosilvopastoral systems (FAO, 2020n). Agroforestry has the potential to provide food, preserve ecosystem services and to contribute to climate change adaptation and mitigation. The IPCC acknowledges that agroforestry systems and tree cover on agricultural land make an important contribution to climate change mitigation (IPCC, 2019a). The NAPAs and the NAMAs developed by Parties under the PA increasingly refer to agroforestry as an approach for mitigation and adaptation in the agricultural sector. Examples of this are the *Plan National d'Adaptation aux Changements Climatiques du Cameroun, 2015*, and the *National Climate Change Adaptation Plan, 2015* of Burkina Faso). Agroforestry can contribute to carbon sequestration and to adaptation when trees and crops are selected to support climate smart agriculture (Abbas *et al.*, 2017). Some of the benefits of agroforestry include an improved and sustained agricultural productive capacity, a contribution to food diversity and seasonal nutritional security, the diversification of rural incomes, an increased resilience to climatic fluctuations, and the perpetuation of local knowledge (FAO, 2013d).

To maximize the mitigation and adaptation potential of agroforestry systems, legal frameworks may need to be reviewed to: a) identify and remove any legal barriers that may be preventing these systems from developing; and b) to accommodate their characteristics. Agroforestry systems straddle several sectors that are often regulated by separate ministries (land, agriculture, forestry and environment). Issues pertaining to land tenure, forest management, agricultural subsidies, food labelling and access to credit all intertwine in agroforestry systems. Agroforestry may fall under the responsibility of a single ministry – usually agriculture or forestry – but it will require effective coordination with other ministries to regulate its many ramifications in an integrated manner.

One example of a legal barrier to the development and legal regulation of agroforestry systems includes the absence of a legal definition of what constitutes agroforestry. The definition can be included in a law on agriculture, on forestry, or in a stand-alone instrument. This will largely depend on the government's underlying policy strategy for the development of agroforestry systems and on whether it is primarily intended to boost food production or environmental services. This decision should as much as possible build on the existing patterns of agroforestry across the country to strengthen them through regulation. Whichever the preferred option is, the definition should be broad enough to capture the linkages with other sectors of relevance to agroforestry.

Once a definition of agroforestry has been agreed upon, there might be a need to draft further legal provisions or to amend existing ones in order to organize the value chain of agroforestry products. One example of the need for such revisions has to do with how taxes applied to agricultural production may penalize agroforestry practices. In the case of the *Common Agricultural Policy of the European Union*, before 2001, subsidies granted to farmers were based only on the surface area of crops. Between 2001 and 2010, beginning with intercropping systems, all agroforestry systems progressively became eligible for subsidies established by the Policy, and now all agricultural lands are eligible, regardless of the degree of tree cover, except for forests and lands used for non-agricultural production (FAO, 2013d).

Legal provisions should lay out the requirements for engaging in agroforestry, plus any environmental restriction or conservation measures, such as the need to carry out an EIA for projects beyond a certain scale, or which are planned in environmentally sensitive areas. In addition, provisions should refer to the health standards that agroforestry farmers must comply with in order to sell their produce locally and to export them internationally. There should also be provisions on produce certification schemes, incentives and access to emissions trading schemes, if applicable. The law should also facilitate access to seeds suitable for agroforestry and provide for training in agroforestry systems. Depending on a country's legislative tradition, this may be done within the same legal instrument, with cross-references

to applicable provisions in other legal instruments (both within sectors and across sectors), or in a separate regulation. Other legal barriers may include caps on leases over state land for agricultural projects. Short leases (under 30 years) are unlikely to encourage farmers to engage in agroforestry, as this is an activity that requires time before it can generate returns on investment. Longer term leases may, on the contrary, provide some assurance to creditors and facilitate access to financial services by farmers wishing to engage in agroforestry (FAO, 2013d).

In Brazil, legislation specifically allows, and even provides, incentives for the development of agroforestry. The Brazilian *Forest Code (No. 12 651/2012, as amended in 2019)* (see Chapter 4) establishes a regulatory framework for land use and environmental conservation on rural properties, with the purpose of protecting native vegetation. The Code permits activities that have a low environmental impact on native vegetation, such as agroforestry exploration and sustainable community and family forest management, provided that the activities do not cause harm to the environment. Further, the Code stipulates different types of protected areas to be maintained in all rural properties. For example, Legal Reserves are areas located within a rural property that are there to: protect vegetation and ensure the sustainable economic use of the property's natural resources; support the conservation and rehabilitation of ecological processes; promote biodiversity conservation; and provide shelter and protection to wildlife and native flora. The size of a Legal Reserve varies according to the biome in which the property is located, as well as its Ecological Economic Zoning, if the property is located in the Amazon region. Landowners whose properties do not comply with the legal requirements of the Code are mandated to regularize the situation by, among other means, recomposing vegetation in the Legal Reserve. This can be carried out by planting intercalated native and exotic species in an agroforestry system, among other options.

A subsequent piece of legislation specifically promotes the adoption of agroforestry in Brazil – *Law 12 854 promoting actions for forestry rehabilitation and settlement of agroforestry systems in rural areas (2013)* promotes actions for forestry rehabilitation and settlement of agroforestry systems in degraded rural areas. The Law stipulates that

the Federal Government will encourage, within existing environmental public programmes and policies, actions for forest recovery and implementation of agroforestry systems in areas of rural settlement that are expropriated by the Government, or in degraded areas that are owned by settled family farmers, especially the Quilombola and indigenous communities. Such actions may be financed from national funds such as Climate Change, the Amazon Fund, the Environment and Forestry Development, as well as other financial sources from bilateral or multilateral agreements, agreements resulting from adjustments, management contracts, and agreements signed with organs and entities of the federal, state or municipal public administration.

5.5. Concluding remarks

This Chapter has explored how legislation can be supportive of implementing climate change goals in the forestry sector. Given the key role forests play in climate change mitigation and adaptation, as well as the substantive contribution of land-use change and mismanagement of forests to the causes of climate change, this is one sector of fundamental importance for climate action.

As opposed to agriculture, where the relationship with climate issues is (to some extent) less obvious, and the fisheries sector (Chapter 6), which has its particularities (e.g. less carbon impact but greater relevance for adaptation), the forestry sector has a well understood relationship with climate issues. This is in particular due to the fact that issues like deforestation are well known challenges with many adverse environmental effects, that now have a tradition of policy and legal attempts to tackle them in many countries. In addition, in many jurisdictions around the world, forestry sector legislation already contains what are known as “traditional” areas of forest law, such as the regulation of forest conversion, illegal logging, and tenure rights of forest dependent peoples (e.g. indigenous communities) which we have seen are very important for tackling climate change mitigation and adaptation. For these areas, the main challenges might be to add a climate angle to the legislation itself or its interpretation. For example, decisions on

conversion of forest land into other uses might need to be adapted to take into account new policy goals such as the maintenance of a forest area for its functions as a carbon sink, in addition to other relevant goals such as biodiversity preservation. In addition, implementation and effectiveness of the laws are also major challenges that countries need to face if legislation is to represent a stronger tool to face climate change.

Given the continued existence of deforestation, illegal logging, and other activities that are not conducive to climate change mitigation or adaptation, legislating for climate change in the forestry sector in an appropriate and effective manner remains a challenging task. Novel issues such as forest carbon rights, regulation of agroforestry, community-based forest management, and the creation of innovative incentives for SFM such as PES and carbon markets, present considerable opportunities that will need to be considered to address climate issues in this sector. The PA has paved the way for more climate action in forestry (e.g. through Article 5 and the support for results-based payments and REDD+), and the examples of legislation presented in this Chapter aim at inspiring and shedding light on how countries can develop and improve their legal frameworks to support such actions.

Chapter 6. Legislating for climate change in the fisheries and aquaculture sector

6.1. Introduction

The multiple activities surrounding the fisheries sector are of key importance for millions of people around the world for their food security and livelihoods. Total production from the fisheries sector reached 171 million tonnes globally in 2016, with 53 percent of this total coming from capture fisheries and 47 percent from aquaculture. This represented a total landed value of approximately USD 362 billion, of which USD 232 billion came from aquaculture alone (FAO, 2018f). The sector employs approximately 200 million people globally, either directly or indirectly, who at the same time play key roles in the use and management of natural, living and non-living aquatic and other resources in coastal, riverine, insular and inland regions. Women represent approximately 19 percent of those employed in the fisheries primary sector, and 50 percent if the secondary sector is also considered (FAO, 2018g).

Climate change is having a significant impact on fisheries and aquaculture, which includes marine and inland capture fisheries, aquaculture in both continental and marine waters and pre- and post-harvest fishing activities. According to a recent FAO report *Impacts of climate change on fisheries and aquaculture*, such impacts will increase and challenges will be observed in terms of:

- ocean warming and acidification, with serious consequences for marine and inland water ecosystems;
- changes in the distribution and abundance of fish species in the ocean, with significant impact on national incomes, in particular when catches concern straddling and highly migratory stocks that circulate within and between exclusive economic zones (EEZs);

- significant decline in marine capture fisheries, threatening food security and livelihoods;
- sea-level rise, with important consequences in terms of destruction of coastal ecosystems and consequently, the livelihoods of related populations. The latest report of the IPCC on the 1.5 °C target of the PA demonstrated that a half-degree extra warming (2 °C instead of 1.5 °C) would lead to sea-level rise of an additional 10 cm and would affect 10 million more people by 2100 (IPPC, 2018);
- increased occurrence of extreme weather events and disasters, with severe consequences for coastal areas;
- small-scale fishers and their communities are among the most vulnerable stakeholders in these sectors, and will be the most severely affected, while having the lowest capacity to adapt to climate change impacts;
- for aquaculture, consequences include: loss of production and infrastructure arising from extreme events such as floods; and increased risk of diseases and reduced production due to negative impacts on farming conditions. Long-term impacts include: reduced availability of wild seed; reduced precipitation leading to increasing competition for freshwater; climate-driven changes in temperature, precipitation, ocean acidification; and incidence and extent of hypoxia together with sea-level rise will have long-term impacts on the aquaculture sector at scales ranging from the organism to the farming system.

(FAO, 2018g)

The aforementioned issues are reiterated by the IPCC's *Special Report on the Ocean and Cryosphere in a Changing Climate*, according to which

the projected effects of climate-induced stressors on polar marine ecosystems present risks for commercial and subsistence fisheries with implications for regional economies, cultures and the global supply of fish, shellfish, and Antarctic krill.

The experts make this assessment with “high confidence” (IPCC, 2019b, pp. 54–63).

The fisheries sector is at particular risk from sea-level rise, storm surges and other extreme weather events exacerbated by the changing climate. Climate change degrades ecosystems, including reefs, wetlands, mangroves, and other marine and coastal habitats, important to fisheries and provisions of essential ecosystem services (IPCC, 2014b). These have consequences on health, distribution and productivity of fish stocks, with effects on nutrition and livelihoods.

In addition, fishing infrastructure such as docks, landing processing facilities, boats and fishing gears are under physical threat of damage from rising sea levels, coastal erosion and inundation (Amaral, Baas and Wabbes, 2012). With intensifying climate impacts, fisher folks and indigenous fishing communities often face adaptive constraints due to marginalization (IPCC, 2014c), along with limited resources including: a low level of access to climate information, if any, and the understanding of such information; and insufficient technology and finance necessary to safeguard assets, adapt to new practices and explore alternative livelihoods. Physical and economic displacement of fishing communities have rippling socio-economic consequences beyond the affected communities. Countries that rely heavily on the fisheries sector as their main source of income and development are particularly vulnerable. In some coastal and island states, the fisheries sector plays a crucial role in providing local communities with nutritious food, economic opportunities, cultural identities, social fabric and way of life.

On the other hand, the contribution of the fisheries sector as a whole to global GHG emissions and climate change is significantly lower than that of the agriculture or forestry sectors. Nonetheless, it is recognized that capture fisheries and aquaculture have a responsibility to limit GHG emissions as much as possible, in order to contribute to global goals. It remains that adaptation rather than mitigation efforts are a more prominent policy goal for fisheries and aquaculture. These two elements are analysed in further detail in Boxes 6.1 and 6.2.

Legal and institutional frameworks can play an important role for the fisheries sector, not only to incorporate more climate-related goals and measures, but to reinforce and provide strength to existing beneficial policies. Adequate legislation regarding sustainable fisheries management (e.g. based on an EAF) will also be important. A transition to low carbon aquatic food systems will also require improved emissions data and dissemination of practical tools such as life cycle assessments and energy audits throughout the supply chain (FAO, 2015).

Clear legal and policy frameworks to promote widespread uptake of best available fuel-saving technologies by large-scale fisheries operators and small-scale fishers could serve to increase profitability while reducing energy consumption. This is mentioned in Chapter 9.8 of the *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication*, which encourage and support actions to increase energy efficiency in the subsector. The monitoring of results and the fine-tuning of fuel subsidies policies in the fisheries industry can help policymakers become more informed about their contributions to climate change vis-à-vis achievement of other intended policy objectives (e.g. increase in employment, income and competitiveness of the fishing sector). Measures on certification, as well as carbon footprint labelling of aquatic products,²⁹ may build consumer and market demands for the seafood industry to invest in high-performance equipment and techniques, improve energy efficiency, reduce waste, and adopt other cost-effective means to reduce its emissions and environmental impacts. Governments can also institute programmes to support the small-scale sector to pilot and apply community-based mitigation approaches.

²⁹ For an early example of such an effort, see Mungkung *et al.*, 2012.

Box 6.1 Adaptation in the fisheries sector

Climate adaptation strategies in the fisheries sector should be context and location specific and consider both short-term (e.g. increased frequency of severe events) and long-term (e.g. reduced productivity of aquatic ecosystems) impacts. Furthermore, adaptation at all levels of governance (community, national, regional and global) is required. FAO has recommended in its *Fisheries and Aquaculture Technical Paper No. 530*, adaptation measures that can be implemented to increase the resilience of the sector, as follows:

- adoption of holistic, integrated, participatory, adaptive and precautionary management. One conceptual framework for this is the Ecosystem Approach to Fisheries (EAF) and to Aquaculture (EAA);
- investment and capacity building on forecasting; early warning systems; safer harbours and landings; and safety at sea;
- disaster risk management, including disaster preparedness and integrated coastal area management;
- integration of fisheries and aquaculture into national climate change adaptation and food security policies, to ensure that climate change impacts will be integrated into broader national development planning (including infrastructure);
- adaptation efforts in other sectors will have impacts on fisheries, in particular inland fisheries and aquaculture (e.g. irrigation infrastructure, dams, fertilizer use runoff), and will require carefully considered trade-offs or compromises;
- aquaculture systems, which are less or non-reliant on fishmeal and fish oil inputs, are considered to have better scope for expansion than production systems dependent on capture fisheries commodities; adaptation options for this sector also encompass diversification of livelihoods and promotion of aquaculture crop insurance in the face of potentially reduced or more variable yields.

Source: Cochrane, K., De Young, C., Soto, D. and Bahri, T. (eds), 2009. FAO Fisheries and Aquaculture Technical Paper No. 530.

Box 6.2 **Mitigation in the fisheries sector**

The production of fish requires the input of fossil fuels, resulting in the emission of GHGs into the atmosphere. Globally, fishing vessels (including inland vessels) consumed 53.9 million tonnes of fuel in 2012, emitting 172.3 million tonnes of CO₂, and accounting for approximately 0.5 percent of total global CO₂ emissions that year. For the aquaculture industry, emissions were estimated at 385 million tonnes of CO₂ equivalent (CO₂ eq) in 2010 (FAO, 2018g). Overall, the energy use of protein production per unit mass of fish is comparable to that of chicken, but is much less than that of pork and beef.

All stages of fish production require fuel use, including wild harvest in marine and fresh waters, aquaculture, shore-side operations, and post-harvest processes. Below is a list of measures that can be taken to reduce emissions and which are applicable to all sectors of fish production and shore-side activities (FAO, 2018h):

- improved engine efficiency of fishing vessels, larger propellers, better vessel shape and hull modifications, and speed reductions;
- the use of fishing gear that require less fuel;
- the use of efficient LED lights for attracting fish;
- the use of shore-side facilities that use renewable sources of power (e.g. wind and solar power);
- in the aquaculture industry, the progressive reduction in the use of energy intensive feedstuffs, improved feed management and, where appropriate, integration of pond aquaculture with agriculture.

A transition to low-carbon aquatic food systems will also require improved emissions data and dissemination of practical tools such as life-cycle assessments and energy audits throughout the supply chain (FAO, 2015).

In addition, coastal and marine ecosystems are considered important sinks for carbon sequestration. 'Blue carbon' stored in mangroves, swamps, salt marshes, and seagrass meadows is an important part of the global carbon cycle, with a sequestration rate of about 53 million tonnes annually (Siikamaki *et al.*, 2012). Blue carbon ecosystems are deteriorating due to land-use change, overfishing, pollution, draining and other disruptive activities, many of which

Box 6.2 (cont.)

can be attributed to climate-blind fisheries and aquaculture practices. Climate-proofing of management frameworks for fisheries and coastal areas can reorient the sector towards a more sustainable path and enhance blue carbon capacities. Decision-makers can institutionalize approaches of EAF and EAA to make significant progress in this regard (Ahmed *et al.*, 2016).

Box 6.3 Fisheries in nationally determined contributions

According to the latest information available at the time of writing, 55 percent (72 out of 131) of countries' nationally determined contributions (NDC) mention fisheries and/or aquaculture when outlining their adaptation areas and/or actions, with 19 countries explicitly mentioning aquaculture. An additional 12 countries refer exclusively to the protection and restoration of marine resources. Of these, 84 countries (72 + 12), 63 mention specific adaptation actions (FAO, 2016a).

- 43 countries mention fisheries and aquaculture management through the development of sectoral plans, 32 countries refer to resilience-building and disaster risk management, including infrastructure measures.
- 20 countries refer to the development of the fisheries sector by improving the legal and institutional framework (e.g. through facilitating access to funding), diversifying livelihoods and creating new opportunities for fishery products.
- A number of countries reflect on climate-smart techniques in the fisheries sector, enhancing the resilience of value chains and dependent communities; an additional 15 percent of countries mention adaptation actions that explicitly target coastal zones and marine ecosystems, without direct or indirect reference to fisheries and aquaculture.

Box 6.3 (cont.)

Conversely, only some countries specifically address mitigation actions in fisheries and aquaculture, generally focusing on feed management, reducing energy use and improving equipment and technology efficiency. These measures are often part of broader national strategies to develop the fisheries and aquaculture sector. Furthermore, mitigation actions are often related to energy efficiency and thus most often accounted for in the energy sector (FAO, 2016a).

This Chapter provides an overview of relevant international legal instruments (hard and soft law) on climate-related areas for fisheries. It then gives an analysis of what an enabling legal framework for more climate sensitive fisheries legislation could look like and indicate legislative approaches that might be explored by countries when wishing to implement specific policy measures, such as an EAF and an EAA.

6.2. International law relevant to climate change and fisheries and international fisheries law

United Nations Framework Convention on Climate Change and the Paris Agreement

The fisheries sector naturally has a role to play in meeting the overall goal of the *United Nations Framework Convention on Climate Change (UNFCCC)* to stabilize GHG emissions in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Likewise, fisheries has to contribute to the achievement of the *Paris Agreement's (PA)* collective goals. Under Article 4 of the UNFCCC, all Parties are committed to promoting sustainable management and to conserving and enhancing GHG sinks and reservoirs, including in the oceans and marine ecosystems. Parties are also committed to preparing for adaptation to the impacts of climate change and to developing and elaborating appropriate and integrated plans for coastal zone

management. This is understood as applying to all sectors of an economy and society.

The Preamble, Section 13 of the PA notes the importance of ensuring the integrity of ecosystems, including the oceans as well as the protection of biodiversity. Further, the adaptation objective contained in Article 2, refers to fisheries as a key sector, given its role as a source of food for a large part of the world's population. In addition, some aspects of the PA reinforce the existing international legal framework, including its call for precaution, sustainability, an integrated approach, decisions based on best available science (BAS) and attention to the rights of stakeholders, including fisher communities, as well as a focus on food security and livelihoods.

In response to the adoption of the PA, a number of new initiatives have been established. For example, the Blue Belt Initiative for Sustainable Fisheries, Oceans and Climate, developed by Morocco, aims to build the resilience of coastal communities and promote sustainable fisheries and aquaculture, in line with SDG14 requirements.

At COP22, The *Strategic Action Roadmap on Oceans and Climate: 2016 to 2021* was released to provide a vision for action regarding oceans and climate in the next five years. It addresses six main areas relevant to oceans and climate: the central role of oceans in regulating climate, mitigation, adaptation, displacement, financing, and capacity development. The Roadmap is based upon a 5-year plan of action covering the oceans and climate, both within and outside the UNFCCC framework. Many of the recommendations made in its Roadmap are relevant to the review of national laws in this sector:

1. Recognition of the central role of oceans in climate regulation and the need to implement GHG reductions to avoid consequences on coastal and island communities, marine ecosystems, and ocean chemistry.
2. Further development and application of mitigation measures using the oceans.

3. Implementation of ecosystem-based adaptation strategies through integrated coastal and ocean management institutions at national, regional, and local levels.
4. Development and use of support measures to address the issues associated with the displacement of coastal and island populations as a result of climate change.
5. Adaptation and mitigation efforts in coastal and small-island developing states (SIDS) countries and communities.
6. Technical and financial assistance to SIDS, developing countries, and economies in transition.

These initiatives, together with other processes taking place under the auspices of the PA, provide an opportunity for formulating best practice guidelines for the implementation of NDCs in this sector, as well as ensuring that national legal frameworks support such implementation.

The Convention on Biological Diversity

As seen in Chapter 4, the overarching goals of the *Convention on Biological Diversity (CBD)* are promoting conservation and sustainable use of biodiversity, and the equitable sharing of its benefits. The CBD encourages national governments to develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations (Article 8(k)). These overall goals are relevant to the fisheries and aquaculture sectors. In addition, the *Strategic Plan for Biodiversity 2011-2020* and the 'Aichi Biodiversity Targets' contain important references to fisheries and aquaculture, as follows:

- Target 6: "By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits".

- Target 7: “By 2020, areas under aquaculture are to be managed sustainably, ensuring conservation of biodiversity”.
- Target 10: “By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are to be minimized, so as to maintain their integrity and functioning”.
- Target 11: “By 2020, at least 17 percent of inland water, and 10 percent of coastal and marine areas, should be conserved through systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes”.

Aichi Targets are to be implemented at the national level through National Biodiversity Strategies and Action Plans (NBSAPs) which are therefore an important source of guidance for decision-making and action on fisheries and aquaculture. Furthermore, several decisions of the CBD-COP refer to marine and coastal biodiversity conservation, management and resilience, the protection and sustainable use of marine ecosystem services, with the underlying application of the precautionary and ecosystem approaches, including the use of available tools such as integrated river basin and integrated coastal zone management, marine spatial planning, and impact assessments.

Rules of the World Trade Organization

The international trade regime has seen some coverage of fisheries and climate change issues. Of note are the ongoing negotiations on fisheries subsidies within the World Trade Organization (WTO). Fisheries subsidies include measures like direct and indirect financial transfers, services and support interventions with different short and long-term effects that will have an effect on the profitability of the sector (FAO, 2003c). Such subsidies are estimated by the United Nations Conference on Trade and Development (UNCTAD) to be as high as USD 35 billion worldwide, of which USD 20 billion are considered to contribute directly to overfishing (UNCTAD, 2020), with the consequent threats to the resilience and livelihoods of fisher populations worldwide, and contributions to GHG emissions.

In 1995, the *Agreement on Subsidies and Countervailing Measures (SCM)* came into force. Though the SCM is not specific to fisheries, it applies to all types of subsidies. In 2012, the World Summit on Sustainable Development urged states to eliminate subsidies contributing to illegal, unreported and unregulated (IUU) fishing. Several proposals have been prepared since then, including an annex to the SCM that would prohibit certain types of fisheries subsidies. Of note, the UNCTAD, FAO and UNEP issued a joint statement in 2016 on “Regulating fisheries subsidies must be an integral part of the implementation of the 2030 sustainable development agenda”, which emphasized the need to address harmful fisheries subsidies as specified in SDG Target 14.6 (FAO, 2018f).

In 2017, a Ministerial Conference in Buenos Aires issued a decision on the need for “comprehensive and effective disciplines that prohibit certain forms of fisheries subsidies that contribute to overcapacity and overfishing, and [on the need to] eliminate subsidies that contribute to IUU-fishing.” While this fell short of a common declaration, it did set a deadline to work toward a comprehensive agreement on fisheries subsidies. Although the negotiations are still ongoing (as of July 2020), the WTO’s Negotiating Group on Rules has presented a draft consolidated text to WTO members on 25 June 2020. This issue is of particular interest at national level, as it would have a big impact on national fisheries policies, as well as climate change ones.

The fisheries sector is distinguished by an extensive network of dedicated international legal instruments, as well as other normative and standard-setting instruments, some of which provide strong legal bases for tackling climate change in the sector. This governance framework has seen the establishment of Regional Fishery Bodies, including Regional Fisheries Management Organizations and/or Arrangements, and other international and regional fisheries entities, which reflects the transboundary nature of fisheries.

The United Nations Convention on the Law of the Sea

The *United Nations Convention on the Law of the Sea (UNCLOS)* provides a widely accepted international legal order for the sustainable use and

conservation of the sea's natural resources and for protection of the marine environment. While it contains no direct reference to climate change issues and their relation to fisheries activities, it does impose on states a duty to protect and preserve the marine environment. This general obligation can be used as the legal basis for tackling climate change impacts on fisheries (e.g. ocean acidification, global warming, sea-level rise, flooding), as well as for alleviating climate change impacts caused by all fisheries-related operations (e.g. unsustainable fishing and aquaculture, GHG emissions from fishing vessels). Amongst its provisions, the following can be cited as being relevant to climate change:

- a general obligation to protect and preserve the marine environment (Article 192);
- an obligation to prevent, reduce and control "pollution of the marine environment" from any source (Article 194(1));
- the definition of pollution of the marine environment: "the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities" (Article 1(4)). This definition includes both direct pollution (e.g. from precipitation of certain chemicals from the atmosphere into the seas resulting in ocean acidification) and indirect pollution (e.g. from melting of inland glaciers resulting in accelerated sea-level rise);
- provisions on the territorial sea (12 nm) which prescribe sovereign powers to mandate protective measures: limit fishing; closing fisheries, creating marine protected areas and measures for sensitive areas such as reefs;
- regulations on the EEZ (200 nm), which include exclusive sovereign rights (e.g. allowable catch); this might have important relations to expected impacts of climate change, as sea-level rise might change the coastal areas that could potentially become

submerged, in addition to the changes in the distribution of stocks, which might have implications in terms of fishing rights in the EEZ (Article 56).

The Code of Conduct for Responsible Fisheries

On 31 October 1995, the FAO Conference adopted the *Code of Conduct for Responsible Fisheries (CCRF)*. Though it is a non-binding instrument, it provides a framework for national and international efforts to ensure sustainable exploitation of aquatic living resources. The principles cover all fisheries activities: the capture, processing and trade of fish and fishery products, fishing operations, aquaculture, fisheries research, and the integration of fisheries into coastal area management. Of note, the CCRF serves as an instrument of reference for states to establish or to improve their legal and institutional frameworks required for the exercise of responsible fisheries, therefore, being a key document in revising and developing fisheries legislation in general.

Article 6 of the CCRF contains recommendations for states and users of living aquatic resources on the conservation of aquatic ecosystems; on how to maintain the quality, diversity and availability of fishery resources in sufficient quantities for present and future generations in the context of food security, on poverty alleviation and sustainable development; and on how to ensure that fishing efforts are commensurate with the productive capacity of the fishery resources and their sustainable utilization, based on the best scientific evidence available, and taking into account traditional knowledge of the resources and their habitat, as along with relevant environmental, economic and social factors. These issues are of particular relevance for adaptation and resilience to the impacts of climate change.

The Voluntary Guidelines on Small-Scale Fisheries

Endorsed by the FAO Committee on Fisheries in June 2014, the *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines)* represent the first, and so far the only, international instrument dedicated entirely

to small-scale fisheries. The SSF Guidelines complement the CCRF and are interlinked with the VGGT, and the *Voluntary Guidelines to Support the Progressive Realization of the Right to Adequate Food in the Context of National Food Security*. Given that the impacts of climate change affect, and will likely be most significantly felt, by small-scale fishing populations, the below recommendations of the SSF Guidelines are particularly noteworthy in this context:

- consultation with fishing communities in the development of policies and plans to address climate change in fisheries (Section 9.2);
- provision of special support to SSF communities living on small islands (Section 9.2);
- support to small-scale fishing communities affected by climate change or natural and human-induced disasters, including through adaptation, mitigation and aid plans (Section 9.4);
- introduction of new technologies that are flexible and adaptive to future changes in species, products and markets, and climatic variability (Section 9.6);
- emergency response and disaster preparedness related to small-scale fishing, with the application of the concept of the relief-development continuum (Section 9.7);
- consider longer-term development objectives in the immediate relief phase, and rehabilitation, reconstruction and recovery, should include actions to reduce vulnerabilities to potential future threats (Section 9.7);
- climate change mitigation: promotion of energy efficiency in the whole fisheries value chain – fishing, post-harvest, marketing and distribution (Section 9.8);
- availability to small-scale fishing communities of transparent access to adaptation funds, facilities and/or culturally-appropriate technologies for climate change adaptation (Section 9.9).

The Sendai Framework on Disaster Risk Reduction 2015-2030

As seen in Chapter 1, the 2015 *United Nations Sendai Framework on Disaster Risk Reduction* represents a framework for the management within all sectors of

the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters caused by natural or human made hazards, as well as related environmental, technological and biological hazards and risks.

The Framework recognizes that addressing climate change as one of the drivers of disaster risk represents an opportunity to manage such risks in a meaningful and coherent manner. The Framework introduces a greater international emphasis on disaster risk reduction (DRR), as opposed to disaster risk management (DRM), and seeks to prevent new risks and reduce existing risks through the implementation of integrated approaches and measures so as to increase preparedness for response and recovery, and thus strengthen resilience (Para. 17).

With the aim to integrate DRR and the building of resilience into policies, plans, programmes and budgets at all levels, the framework sets four priorities: 1) understanding disaster risk; 2) strengthening disaster risk governance; 3) investing in disaster risk reduction for resilience; and 4) enhancing disaster preparedness and to “Build Back Better” (Para. 20). These goals are also directly relevant to, and complement, the implementation of the PA. Indeed, in adopting the PA, the Parties welcomed the adoption of the Sendai Framework (see Preamble to Decision 1/CP.21).

The Sustainable Development Goals

In addition to a dedicated SDG 13, which requires countries to “integrate climate change measures into national policies, strategies and planning”, several other SDGs include provisions that are relevant for taking action related to climate change and fisheries:

- SDG 2: End Hunger, achieve food security and nutrition, and promote sustainable agriculture. Target 2.3 aims to double the agricultural productivity and incomes of small-scale food

producers by 2030, including fishers, *inter-alia* through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition, and non-farm employment.

- SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development. Among the many sub-targets of this goal, the following can be highlighted:
 - reduce marine pollution;
 - manage and protect marine and coastal ecosystems, including to increase their resilience;
 - address the impacts of ocean acidification;
 - regulate harvesting and end overfishing, end IUU fishing and destructive fishing practices, and implement science-based management plans;
 - by 2020, conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on the best available scientific information;
 - by 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to IUU fishing and refrain from introducing similar new subsidies;
 - increase the economic benefits to SIDS and LDCs from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.

All these topics, which have direct links to the PA and its goals as related to the fisheries sector, should be considered in national processes of decision-making and planning.

PARLATINO Model Law on Small-Scale Fisheries

In June 2017, the Latin American Parliament (PARLATINO) released *Ley Modelo de Pesca Artesanal o en Pequeña Escala*, a model law on SSF based

upon which countries in the region are expected to develop national policies and laws for the empowerment and sustainability of the SSF sector so as to enhance its contributions to food and nutrition security (FAO, 2016i). Chapter IX of this instrument addresses climate change and risk management:

- Article 32: Climate change – States shall apply multi-sectoral approaches, inter-sectoral policies, prevention strategies, early warning, adaptation and mitigation, as well as differentiated plans for the adaptation of artisanal or small-scale fisheries, in all their food systems, to combat the negative effects of climate change, and to strengthen the resilience of fisheries communities to natural disasters.
- Article 33: Risk management – States shall undertake inter-sectoral coordination to promote more effective risk management, with multi-dimensional focus, to strengthen the sustainability of artisanal or small-scale fisheries, as well as for territorial development, including the promotion of harmonious and sustainable use of natural resources, in particular water.

As can be seen from this review of international instruments, there is no lack of binding instruments and of soft law guidance instruments that apply to or are relevant for the development of climate-friendly fisheries legislation at national level. It is a matter of understanding how to develop national policies and laws in light of these instruments and guidance in a manner that reflects national priorities and national means.

6.3. Addressing climate change in national fisheries and aquaculture legislation

Fisheries management is a function of public policy and administration. At the macro level, different models for monitoring and regulating fisheries can be distinguished: 1) free access and economic liberty; 2) State control through public administration; and 3) delegation of control to stakeholders or institutions. Most often, the systems adopted at national level will be a combination of these three models (FAO, 2009a).

The CCRF, as discussed, calls on states to adopt measures for the conservation and sustainable use of fishery resources “through an appropriate policy, legal and institutional framework” (Article 7). Fisheries law is the body of law governing fisheries and aquaculture, although the latter is often addressed in separate legislation. Fisheries law is an intrinsic component of fisheries management. It generally supports the implementation of fisheries policy, defining the scope of its application and establishes institutional mechanisms for fisheries management and defines management responsibilities. It regulates the interests of fishers and other stakeholders to facilitate the attainment of fisheries management objectives and contains monitoring, control, surveillance and enforcement provisions. In many countries, there is a principal national fisheries law, accompanied by subsidiary legislation such as regulations, decrees, or administrative orders (FAO, 2009a).

A recent FAO Technical Paper entitled *Impacts of climate change on fisheries and aquaculture*, highlights three principal areas that can be targeted for successful climate change adaptation in these sectors: institutions, livelihoods and risk reduction, and management for resilience. Legislative initiatives in these areas would need to be implemented by public institutions and/ or the private sector, within an existing governance framework. The Paper also notes that enabling climate change adaptation and resilience-building of fisheries management and governance processes will necessarily need to integrate management approaches such as the EAF and EAA (FAO, 2018g), further explored in the following sections.

We will address these issues by firstly examining elements of an enabling legal framework, which includes institutional mandates, integration of relevant principles in legislation, spatial planning and tenure rights, as well as examples of national laws aimed at achieving sectoral climate objectives, both for adaptation and mitigation.

6.3.1. Institutional frameworks and mandates

States will most commonly entrust public administrations with the management of fisheries areas and their resources, designating a

minister or secretary of state as the political and administrative authority with executive power to define and implement fisheries policies. Such authority will represent the government, develop legal norms applicable to the sector, and manage the administrative services that oversee the social and economic activities of the fishing sector (FAO, 2009a).

Fisheries authorities will typically make decisions on the areas and periods in which fishing is allowed, on allowable fishing gear and methods, as well as on measures for fisheries protection, conservation and restoration. Examples include issuance of regulations on management and conservation measures, minimum catch sizes, closure areas and total allowable catch (TAC), among others. Moreover, they will also typically regulate fisheries production activities (e.g. aquaculture feed quality, registration of fishing fleets, discharge water standards, measures to prevent escapement, labour requirements), post-production activities (i.e. transshipment, landing ports, fish markets, processing plants, transportation), and their marketing.

In carrying out their mandates and responsibilities, fisheries authorities can employ a number of tools and methods. Licensing systems are the most common, together with authorizations and permits. They may also require catch documentation and installation of on-board tracking devices (such as surveillance aircraft and satellites). Other common measures are inspection, issuance of certifications, imposition of sanctions, and prosecution, similar to that adopted by the *European Union Control Regulation (No. 1224/2009) establishing a Community control system for ensuring compliance with the rules of the common fisheries policy*. Ideally, and in order to be best prepared for climate change, fisheries authorities should be structured and managed in ways that can function effectively in face of uncertainty with regards to stock, as well as other environmental and socio-economic conditions (Miller, 2007). They should be organized and operationalized with the aim of achieving their legislative mandates in spite of shifting contexts and management challenges, which translates into finding ways to integrate flexibility into the measures they may adopt.

Climate change is accentuating the ever-evolving operational conditions under which fisheries authorities operate: growing uncertainties could frustrate the achievement of planned objectives envisioned in fisheries legislation, such as increased food security, stable livelihoods as well as environmental sustainability, and inclusive economic development. FAO highlights that a framework to address climate change may require a modification of existing public policies and legal frameworks, for example with a view to enhancing knowledge, transparency, incentives and adaptation. Some measures recommended by FAO are:

- developing mechanisms for cross-sectoral coordination at local, national or international levels (e.g. for food security, poverty reduction, emergency preparedness and others);
- integrating fisheries and aquaculture management with other resource use management (e.g. development, recreation, tourism, oil and gas extraction) to holistically manage river basins, watersheds and the coastal zone;
- transparency in resource allocation and transfer of resource access across different sectors, and development of cross jurisdictional agreements;
- fisheries planning, management and monitoring should, if not already in place, move away from top down command and control approaches, to a more devolved style of management that shares management responsibilities with resource users.

(FAO, 2018g)

One way to address climate change in relation to the fisheries sector is to integrate climate change goals such as adaptation, resilience and mitigation into principal fisheries legislation. This can be done by broadening the institutional mandates of fishing authorities to include climate change, thereby requiring such authorities to consider the causes and impacts of climate change in all relevant decision-making processes (e.g. in establishing closed areas/seasons). FAO points out that a review of national institutions should examine the mandate and expertise of

all fisheries agencies to assess the extent to which they are required to consider climate change in making regulatory decisions.

States may also consider whether such fisheries agencies should be placed under a legal duty to ensure fulfilment of their NDC and NAP so far as relevant to fisheries and aquaculture (FAO, 2018g). Examples of such legislative measures can include creating an explicit requirement that the measures to address climate change impacts on fisheries are also included in instruments such as Fisheries Management Plans (FMPs). Also, the creation of a clear duty for the fisheries authorities to promote and contribute to the implementation of national climate change policies, strategies and plans, is useful (FAO, 2018g).

Institutional mandates that include climate change will help to engage agencies responsible for granting fishing and aquaculture licenses in the identification and alleviation of specific climate concerns and to guide the adjustment of fisheries management frameworks to be more in line with national climate goals, as defined in overarching climate change legislation or other national policy documents. To illustrate, a mitigation target that sets limits on GHG emissions from the sectors, based on mitigation commitments under NDCs, can serve as a reference point for fisheries authorities to impose fuel-use conditions on fishing licenses.

Fisheries authorities could also enhance participation in cross-agency platforms or mechanisms addressing climate change, and take part in policy coordination with other sectoral authorities. An example comes from Senegal, where the *Marine Fisheries Code (Law 98-32 of 1998)* established the National Advisory Council for Marine Fisheries, which comprises representatives from the fisheries administration, research units, port authorities, the ministries of defence, finance, environment, and decentralization, as well as persons representing ship-owners, artisanal fishers, fish sellers, the aquaculture sector and recreational fishers. Its function is to advise on draft FMPs and make proposals on the implementation of the Fisheries Code. The 1998 law also provided for the minister in charge of marine fisheries to establish advisory bodies for artisanal fisheries in the regions, which also have the function of ensuring that artisanal fishers are informed about conservation and management

measures (FAO, 2016j), including relating to climate change. In 2015, this law was replaced by a new Marine Fisheries Code (*Law No. 2015-18 of 13 July 2015*) which updates and reinforces the earlier provisions in the context of overall marine fisheries law and management.

Regular monitoring of the implementation and impact of adopted policy is another important aspect to include in the mandates of fisheries authorities, as this will inform future decision-making regarding stocks and aquatic ecosystems. Fisheries legislation may provide that fisheries authorities be legally required to gather key data and map predicted climate impacts on underlying ecosystems (e.g. mangroves, coral reefs), fish stocks (e.g. distribution, biodiversity) and fishing communities (e.g. coastal erosion, food insecurity, displacement). Such information-gathering may of course necessitate additional resources and expertise. Involving local fishers and community members in a participatory manner can not only empower such stakeholders but also help increase soundness and acceptability of policies in decision-making.

Nonetheless, a climate mandate alone is not sufficient to translate into concrete action. Entire systems may need to be restructured or reorganized, and capacity and knowledge may need to be developed. In addition, existing legal policy and organizational governance of the fisheries and aquaculture sectors need to be reviewed and climate-proofed. For instance, legislation on permits has to be reviewed to determine the extent to which it incorporates change impacts in the awarding of licenses and their operational conditions. Climate review of fisheries governance would not only reveal gaps and entry points in the existing operational infrastructure, but also provide the opportunity for the fisheries authorities to establish baselines and define sectoral targets – for both mitigation and adaptation. These targets should refer to the NDCs and give effect to the institutional climate change mandate.

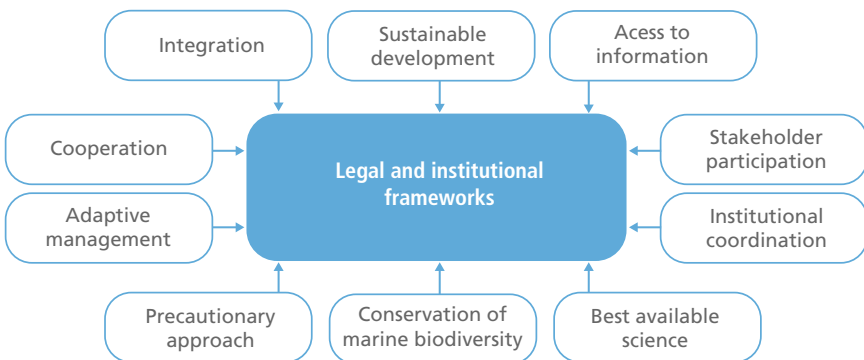
6.3.2. Integrating key principles for climate change in fisheries and aquaculture legislation

As indicated in Chapter 1, there are a number of commonly accepted, essential principles of international law that can be weaved into

legislative frameworks for relevant decision-making processes. Primary laws may be an appropriate place for the inclusion of these principles. Guidance on their interpretation and application can be explained in subsidiary legislation or administrative guidance documents.

Key legal principles related to fisheries and climate change include those outlined in the 2016 FAO publication *A how to guide on legislating for an Ecosystem Approach to Fisheries*, namely the precautionary approach, stakeholder participation, access to information, institutional coordination, cooperation and integration, sustainable development, adaptive management, and preservation of marine biodiversity (FAO, 2016j). Furthermore, relevant principles from the PA (see Chapter 2 of this Study) such as ‘best available science’, are also important mechanisms through which to mainstream climate considerations in fisheries legislation. The list of principles mentioned here is not exhaustive but is intended to offer some guidance for the effective administration and implementation of legislative provisions.

Figure 6.1
Key principles to integrate into legislation on fisheries and aquaculture



An example of legislation that incorporates these principles is South Africa's *Marine Living Resources Act (No. 18 of 1998)*, which stipulates that the minister and any organ of state shall, in exercising any power under this Act, have regard to the following objectives and principles:

- a. the need to achieve optimum utilization and ecologically sustainable development of marine living resources;
- b. the need to conserve marine living resources for both present and future generations;
- c. the need to apply precautionary approaches in respect of the management and development of marine living resources;
- d. the need to utilize marine living resources to achieve economic growth, human resource development, capacity building within fisheries and marine culture branches, employment creation, and a sound ecological balance consistent with the development objectives of the national government;
- e. the need to protect the ecosystem as a whole, including species which are not targeted for exploitation;
- f. the need to preserve marine biodiversity;
- g. the need to minimize marine pollution;
- h. the need to achieve to the extent practicable, a broad and accountable participation in the decision-making processes provided for in this Act;
- i. any relevant obligation of the national government or the Republic in terms of any international agreement or applicable rule of international law;
- j. the need to restructure the fishing industry to address historical imbalances and to achieve equity within all branches of the fishing industry.

(FAO, 2016j, p. 12).

Particularly noteworthy is principle 'i.' which binds government action in this sector to take account of international instruments such as the UNFCCC and the PA.

a. Precautionary principle

In the context of public decision-making on fisheries and aquaculture, applying the precautionary principle can mean disfavoured overexploitation. A common precautionary feature of fisheries management is the setting of a low level of allowable harvest for species whose data for stock assessment are deemed insufficient, unreliable or out-of-date (Gullet, Paterson and Fisher, 2001).

One example of incorporating this principle into national fisheries legislation is the Saint Kitts and Nevis *Fisheries Aquaculture and Marine Resources Act (No. 1 of 2016)*. The Act mandates that the precautionary principle "shall be applied to the management and development of the fisheries" (Section 5) and that fisheries access agreements may be suspended or limited if "continued fishing at current levels would pose a risk to the fish stocks based on a precautionary approach" (Section 43).

Another example is New Zealand's *Fisheries Act (No. 88 of 1996)*, which clearly states in the first paragraph of Article 6 that

States shall apply the precautionary approach widely to conservation, management and exploitation of straddling fish stocks and highly migratory fish stocks in order to protect the living marine resources and preserve the marine environment.

b. Best available science

The principle of best available science (BAS), explored conceptually in Chapter 2, in fisheries and aquaculture decision-making can be incorporated into existing mechanisms, such as catch documentation, catch effort records, total allowable catch regulations and other information gathered under existing monitoring, control and surveillance (MCS) systems. Data on climate change impacts on fisheries, such as

ecological indicators, localized assessments of socio-economic impacts, coastal erosion, wave damage, flooding, fresh water scarcity, food insecurity and livelihood disruptions, can be used to inform management decisions such as which species can be caught and in what quantities. Making use of available science in fisheries management is a prerequisite of more flexible and adaptive fisheries management strategies (Johnson and Welch, 2010).

The General Fisheries Commission for the Mediterranean (GFCM), which is a Regional Fisheries Management Organization created under the auspices of FAO in 1949, is an example of an institution whose very foundation is based on the BAS principle. Articles 5 and 8 of the Agreement establishing the GFCM, instruct that the Commission shall formulate appropriate conservation and management measures based on “the best scientific advice available”. Translating this instruction in the context of the declaration of fisheries restricted areas, *Resolution GFCM/41/2017/5 on a network of essential fish habitats in the GFCM area of application* invites the Scientific Advisory Committee on Fisheries (a subsidiary body of the Commission) to “review the existing information”, “identify possible knowledge gaps and provide advice on measures to overcome these”.

Another example is Thailand’s *Royal Ordinance on Fisheries B.E. 2 558 (2015)*, which requires the use of BAS “to achieve long-term economic, social and environmental sustainability, in line with the ecosystem based approach and precautionary approach, to ensure that fisheries resources are maintained or restored to a level that can produce the maximum sustainable yield” (Section 4(5)), and in the development of fisheries policies and management frameworks (Sections 12, 21 and 55).

c. Public participation and access to information

Integrating public participation into climate-related decision-making for the fisheries and aquaculture sectors means consulting with and involving fishers, fish farmers and fishing communities in determining sectoral climate targets and developing corresponding strategies and plans (Costanza, 2000). Mechanisms that facilitate participation and

transparency include involving relevant stakeholders in advisory councils or bodies; guaranteeing them the right of access to information; the right to comment on proposed management decisions or actions, in meetings and in writing; and the right to engage in the management process more generally (FAO, 2016j). Furthermore, stakeholders should be provided the opportunities and support required to take part in implementation, monitoring, provision of feedback and revision of measures through established processes and channels.

Fisheries legislation should lay down frameworks for public access to relevant information as a pre-requisite for enabling meaningful public participation. This information can include the scientific basis for certain measures, statistics on climate change impacts on fish species and stocks, on permits and licenses, and on third party access agreements, among others. The legislation can also prescribe minimum requirements for consultations with stakeholders and other interested parties.

The *National Integrated Coastal Management Framework and Implementation Strategy* of Vanuatu established in December 2010, provides an example of how to embrace the principle of public participation in fisheries management decision-making. The Framework is “designed to allow for stakeholders, managers, and those involved in management of Vanuatu’s coastal resources, to identify the most appropriate response to best manage coastal resources for long term sustainable use”. Additionally, climate change considerations and associated adaptation measures will be adequately addressed during all stages of development processes undertaken within the coastal environment. The Strategy document identifies relevant stakeholders and groups them into community, private sector, non-governmental organizations and government. The Implementation Strategy is based on the premise that specific Integrated Coastal Management (ICM) Plans be developed based on the bringing together of interests, issues and activities, as well as the responsibilities of all the stakeholders and the tools available for implementing actions, as follows:

Under each tool are the undertakings of each stakeholder within that area covered by the ICM plan. This way, the interest, activity and responsibility

of each stakeholder is visible by everyone to enable better monitoring. Activities and undertakings are highlighted in the various plans (tools) developed by each sector. For instance, other agencies are able to see what DoF [Department of Fisheries] is doing, how it is doing it and why they are doing it and what is expected to be achieved. Likewise, the DoF can better understand what other stakeholders are doing.

6.3.3. Integrated coastal planning and fisheries tenure rights

a. Integrated coastal planning

The IPCC, in Assessment Report 4, concluded that “reactive and standalone efforts to reduce climate-related risks to coastal systems are less effective than responses which are part of integrated coastal zone management (ICZM), including long-term national and community planning” (IPPC, 2014c). This position was also reflected in the conclusions of the *Strategic Action Roadmap on Oceans and Climate: 2016-2021* (mentioned earlier), which recommends the implementation of integrated coastal and ocean management institutions at national, regional, and local levels to reduce vulnerability of coastal/ocean ecosystems and of human settlements, and to build the management capacity, preparedness, resilience, and adaptive capacities of coastal and island communities (Global Ocean Forum, 2016).

One example of this approach can be found in Sri Lanka, where the *Coast Conservation Act (No. 57 of 1981)* vested responsibility for the administration, control and custody of the coastal zone in the country to the Coast Conservation Department (CCD). The Department Director has overall responsibility for the administration and implementation of the Act, including the survey and inventory of coastal resources, the preparation of a national Coastal Zone Management Plan, an action plan adopted by the Department for management of the coastal zone during a five year period, which should be revised and updated periodically. It is to be designed to ensure sustainable use of the coastal environment and its resources in the long-term, while satisfying current national development goals. The Act outlines the management objectives of the Department for the period under consideration, the policies to be adopted, and the

strategies and actions required for effective management of the coastal zone in the face of competing resource uses.

b. Fisheries tenure rights and climate change

The development of formal tenure arrangements in fisheries has focused, historically, on the right of access to fisheries and fishing spaces as well as on the use of fishery resources. In this context, even though the terminology of “rights” (as in rights-based management) is more commonly used than “tenure”, the latter is considered a more meaningful term here because it includes also the depiction of relationships between people and the ownership and use of a resource. The concept of tenure includes formal and informal customary systems as well as societal notions of rights that individuals, groups of people or communities may have to fisheries resources. The term “tenure rights” is seen by FAO as a bundle of rights which includes use, access and management rights, and not only ownership (FAO, 2013e).

While formal tenure rights are generally still a developing concept in fisheries, there is a long history of customary and traditional tenure systems within fishing communities. These have tended to be in the form of rights (to fish) in certain areas, i.e. spatial access or use rights, and are often intertwined with land tenure. In many countries, natural resources and the space they occupy have traditionally not been divided into land and water. Instead, nature, including humans and society, has been seen holistically, with communities having a multifunctional resource space as the basis for their livelihoods. Hence, fisheries tenure cannot be viewed in isolation but needs to be considered within a broader context encompassing land tenure and livelihoods (FAO, 2013e).

Because of the characteristics of fisheries resources, it is often difficult to determine who owns them or has rights to them. The “ownership”, in particular private or individual ownership of fisheries resources, is less straightforward to determine than land ownership. In fact, while fish in a lake on someone’s land could be seen as privately owned, in the marine sector individual ownership in the fishery is rare. Often, fishery resources are collectively owned by the communities that use them, and

the concept of common property is important to many indigenous and SSF communities. In the marine EEZs of countries, states have sovereign rights over the exploration, exploitation, conservation, and management of natural resources, including living resources, and governments are thus responsible for managing these resources. A variety of measures to control fishing can be used (e.g. licensing, catch quotas, gear regulations), and governments can also delegate management rights and responsibilities to individuals or communities (FAO, 2013e).

Fisheries tenure rights can be statutory (including the statutory protection of customary rights) or be grounded purely in customary practice. Customary tenure rights of a community include the collective rights to the natural commons, as well as private rights of individual community members to specific land parcels or natural resources. Informal tenure rights that lack formal, official protection by the state often arise spontaneously, e.g. the emergence of informal tenure rights resulting from human migration (FAO, 2013e).

States should, in accordance with the VGGT (see Chapter 4 of this Study), recognize, protect and enforce all legitimate tenure rights in the fisheries sector, according to each national context. Further, the challenges posed by climate change may require additional considerations on the allocation and management of fisheries rights, as follows:

- If and when climate change leads to changes in the distribution of fisheries resources, tenure arrangements pertaining to those resources might need to be adapted. This is not easily addressed but it is important that governments recognize the issue and that in designing tenure rights systems, safeguards and options are built in to allow for adaptation and flexibility of the arrangements over time, as required, with the ultimate aim of securing food security and livelihoods. Diversification of livelihoods for communities most vulnerable, or who depend on fish species that are most vulnerable to climate change impacts, can be a strategy to strengthen the resilience to climate change consequences. This would translate into supporting alternative means of securing livelihoods or securing access to alternative resources.

- Similarly, sea-level rise might lead to impacts in tenure over coastal areas, changes in territorial boundaries and even loss of territories (for instance in SIDS) that will need to be addressed by legislation.
- When addressing climate change impacts and disaster risks in national planning, the reality of fishing communities needs to be considered. In the context of disasters, emergency response, disaster preparedness and sustainable livelihoods, among other issues, need to be understood and considered. Ensuring adequate protection of tenure rights to critical resources would be an important step towards establishing resilience.

(FAO, 2013e)

The issue of fisheries tenure rights becomes more prominent in the context of small-scale fisheries which as a term comprises subsistence fisheries, artisanal fisheries, customary or aboriginal fisheries, and small-scale commercial fisheries, whether in inland waters or at sea, as these groups are typically more vulnerable because they are more dependent on fisheries for their livelihoods. Small-scale fishing communities, indigenous and others, often see fishing (and related activities) not only as source of income, but also as an expression of their traditional way of living. Protecting this is a question of social justice (FAO, 2013e).

These communities are particularly exposed to natural disaster risks related to increasing storm intensity and frequency, because of their location on the coastlines or in inland areas. Severe weather events may also increase the risks associated with working at sea, disrupting fishing practices that are based on traditional knowledge of local weather. In addition, such communities face the risk of reduced coastal areas due to sea-level rise (FAO, 2013e).

In order to address the particular vulnerabilities of SSF, the following measures can be relevant:

- vesting use and management rights in SSF communities is likely to bring economic, social and environmental gains;

- linking fishing rights and human rights would be more in tune with the reality of the diverse livelihoods of small-scale fishing communities and the complexity of poverty. This implies giving fishers rights to adequate livelihoods and equitable benefits. Fair and secure tenure rights should balance social, cultural, economic and environmental goals, assist in reducing conflict, enhance food security and livelihoods for small-scale fishers and fishing communities, and facilitate the conservation of local ecosystems.

(FAO, 2013e)

As such, the responsible governance of fisheries tenure can contribute to multiple climate-related objectives, including alleviating poverty, building resilience, strengthening food security, promoting gender equity and conserving biodiversity.

Box 6.4 **Rights-based fisheries management**

Rights-based fisheries management regimes have been adopted to strengthen the economic viability of the fishing sector and improve the sustainability of fish stocks. Some examples of existing systems:

- Open access, which represents the least exclusive regime that allows free accessibility to fisheries resources with no well-defined access rights, or very limited ones.
- Limited entry regimes, in which licenses make the right to participate in fishing the resource contingent upon compliance with regulations such as gear and/or effort limitations.
- Individual transferable quotas (ITQs), in which quota ownership is required to fish a proportion of the total catch or effort;
- Territorial use rights for fisheries (TURFs), in which rights are granted to fish specific fishing grounds, a more common approach in artisanal and small-scale fisheries.

Box 6.4 (cont.)

Research on the impacts of diverse fisheries management models shows that TURFs and ITQs lead to greater results in terms of resilience, than open access regimes. TURF owners and quota holders with a direct, longer-term interest in the sustainability of the resource are likely to be more willing to invest in and implement climate mitigation and adaptation strategies (e.g. connected TURF networks or multi-species ITQs). It is reported that ITQs seem to present the advantage of providing stewardship incentives to quota owners, potentially resulting in more sustainable harvests. On the other hand, the social resilience of the fisheries sector can be compromised as the implementation of the ITQ system may force excluded fishers to exit the fishery. Spatial rights-based approaches such as TURFs are considered to provide a better foundation for building resilience by encouraging stewardship in fishers, as well as ecosystem-based management and conservation. At the same time, the research acknowledges that all systems exhibit variation in socio-ecological resilience, and careful design of the regulatory and management instruments are fundamental.

Source: Ojea, Pearlman, Gaines and Lester, 2016.

6.3.4. Disaster risk management and reduction in fisheries

The character and severity of impacts on the fishery and aquaculture sectors from extreme climate events and weather variability will most likely increase, affecting the most exposed and vulnerable countries and communities that depend on these sectors for their livelihoods. African and Southeast Asian countries and SIDS, regions that are already vulnerable in terms of socio-economic challenges, are expected to be more impacted than other regions. Therefore, DRR and management measures, as provided for in the Sendai Framework and Aichi Targets mentioned earlier, including preparedness for climate disaster response and recovery, should be integrated into fisheries and aquaculture sector management (FAO, 2018g).

FAO highlights the following key measures and possible solutions for

implementing DRR and DRM in the sector:

- consideration of intensification of storms and sea-level rise, and the risks and impacts of inland and coastal floods and droughts for inclusion into policies, strategies, management plans and regulatory frameworks;
- creation of monitoring and early warning systems, which are essential to protect people and their assets. Local, district, national and regional knowledge networks are needed to analyse and share the information collected, and to assess the risk level and agree on early warning triggers for early action and emergency responses;
- measures to reduce vulnerability and increase adaptation and resilience, such as safety at sea, climate resilient infrastructure, due consideration to the health of aquatic ecosystems, and insurance and social protection schemes;
- preparing and responding to climate change-related disasters affecting fish dependent livelihoods.

(FAO, 2018g)

The promotion of resilience of both fragile environmental systems and affected communities can become a duty mandated to fisheries authorities by national fisheries legislation. The authorities will then need to identify and assess the specific vulnerabilities of ecosystems and communities in the sectors, and develop or adapt methodologies to reduce their exposure to climate risks and build their coping and adaptive capacities. Of note, it should be considered that expansion of institutional mandates should always consider the budgetary and staffing resources needed to fulfil such mandates. Several countries have passed legislation that enables the implementation of the issues mentioned earlier.

In Indonesia, various laws include provisions for the protection and empowerment of fishers, fish raisers and salt farmers against the risks of climate change, including fisheries insurance against the risks of natural

disasters, climate change and contamination.³⁰ These Acts determine the responsibilities of the central and decentralized government authorities and of society as a whole in the mitigation of disasters in coastal areas and isles. The Acts also establish a duty for the central government to implement a policy response for marine disasters through the development of disaster mitigation and early warning systems. The Law also mandates central and regional governments to integrate the prevention and disaster management system for the fisheries sector into national disaster frameworks.

In Italy, *Legislative Decree No. 100/05 on the Establishment of the National Fishery and Aquaculture Solidarity Fund*, as updated by a Ministerial Decree of 2016, provides for the Establishment of the National Fishery and Aquaculture Solidarity Fund to assist fishery and aquaculture production structures in the event of a natural disaster or exceptional marine and meteorological adversity.

In Japan, the *Basic Fisheries Act (No. 89/01 of 2001)* creates in Article 24, the obligation on the central state to take the necessary measures, such as reasonable compensation, to prevent any possible impediment to fishery reproduction by disasters, and to contribute to stable fisheries management and to mitigate any significant price volatility of marine products.

6.4. Legislation addressing adaptation to climate change for fisheries

As mentioned previously, fisheries and aquaculture adaptation feature prominently in the NDCs of a number of countries, notably those of SIDS and coastal states, which highlight general measures such as better fisheries management for a sustainable fisheries sector (FAO, 2016a). Broadly, the elements of fisheries management and governance that are

³⁰ Law of the Republic of Indonesia No. 7/2016 on the Protection and Empowerment of Fishermen, Fish Raisers and Salt Farmers, Article 3(e) and Article 30; Law of the Republic of Indonesia No. 27/2007[2] regarding the Management of Coastal Area and Isles, Articles 56–59; and Law of the Republic [3] of Indonesia No. 32 of 2014 about the Sea, Article 53(1)(c), Article 53(4)(a)(b) (c), Article 54(2)(a)(b) and Article 55(2).

considered critical for enabling climate change adaptation and resilience-building are a focus on ecosystems; the capacity to cope with complexity and uncertainty; the integration of multiple sectors and scales; the capability to monitor and review; and effective and inclusive stakeholder engagement and empowerment.

FAO recommends the following policy approaches for effective climate adaptation in the sector:

- incorporating “integrative science”, i.e. the process of bringing a plurality of knowledge sources available to support suitable institutional responses; this can be accomplished, for instance, by integrating BAS as a principle for decision-making;
- applying a broader planning perspective, and developing resilience-building strategies;
- changing existing public policies and legal frameworks, for example with a view to enhancing knowledge and transparency;
- developing mechanisms for cross-sectoral coordination at local, national or international levels;
- removing or restructuring economic incentives so as to reduce the level of fishing pressure or promote flexible adaptation;
- integrating fisheries and aquaculture management with other resource-use management (e.g. development, recreation, tourism, oil and gas extraction) to manage river basins, watersheds and the coastal zone in an integrated manner;
- mainstreaming of fisheries and aquaculture adaptation strategies into existing guidelines, for example, ICZMs, EAAs/EAFs, environmental impact assessments, social impact assessments, national development plans, national budgets, as well as in international climate change negotiations.

(FAO, 2018g)

In order to promote such goals, FAO recommends the adoption of management approaches such as the EAF and EAA, which are further explored in the following subsections. (FAO, 2018g).

A number of legislative approaches can support adaptation in the fisheries and aquaculture sectors and we present some examples that have been identified in relevant literature. In this Section, we treat aquaculture together with fisheries, although it is an area that would normally be regulated by separate provisions or even in stand-alone legislation. More considerations that are specific to aquaculture are made in Section 6.3.4.

6.4.1. Legislation promoting an ‘Ecosystem Approach to Fisheries’ management

The Ecosystem Approach to Fisheries (EAF)

strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic, and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries. (FAO, 2009b, pp. 11–12).

According to the FAO Expert Consultation in Reykjavik in 2003,

the purpose of an ecosystem approach to fisheries [...] is to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from the full range of goods and services provided by marine ecosystems (FAO, 2003a).

Among these goods and services are climate mitigation (e.g. carbon sequestration) and adaptation (e.g. provision of food and livelihood). In 2016, *Decision XIII/4 on Biodiversity and climate change*, the Conference of the Parties to the CBD recognized that “ecosystem-based approaches can be technically feasible, politically desirable, socially acceptable, economically viable and beneficial” and encouraged governments to promote wider use of such approaches in marine and coastal areas, and their integration into climate adaptation and mitigation.

The EAF is an approach that accounts for synergies and potential trade-offs between competing objectives (Hilborn, 2007). It can serve to frame fisheries conservation and management measures that reconcile and simultaneously satisfy these diverse objectives, all of which are affected by climate change.

The EAF is considered a key enabling approach for holistic, integrated and adaptive fisheries management. When properly structured and implemented, EAF can support governments to achieve ecological sustainability, social equity and economic efficiency, in other words long-term sustainability, protection of biodiversity, employment and income generation, as well as protection of livelihoods and equitable access to resources. By embracing EAF, fisheries managers and other relevant stakeholders, including fishing communities, can create a more conducive environment where climate actions within the sector and their rippling effects can be carefully considered and executed. Currently, most fisheries laws focus on the effect of fishing on fish stocks and the marine environment. However, this traditional conceptualization does not consider the effects of climate change on the marine environment, nor on fish stocks and habitat and ultimately upon fishing activities (Searles Jones, Fredrickson and Leibman, 2015).

Even though laws can include various objectives of fisheries management, such as biological, economic and social ones, in practice it is challenging to devise management plans and measures that simultaneously achieve all three in a holistic and complementary manner.

In fact, to be properly implemented, EAF requires a highly complex set of rules and norms that appreciate the interactions between fish species, their ecosystems and the wide range of social and cultural factors related to fisheries. Reforming fisheries and aquaculture legislation can require the development of an EAF-based management plan that sets clear targets with indicators on sustainability, biodiversity, habitat and socio-economic conditions. Such plans can, for example, apply harvest control measures (e.g. closed seasons and catch areas, limits on fishing effort, gear restrictions, quotas) with monitoring frameworks that track environmental, economic and social indicators, which can in turn trigger amendments to adopted measures. Moreover, there could be a legal requirement to coordinate and align with other frameworks regulating areas that affect the ecosystems in which fisheries operate. Fisheries authorities could be mandated to play an active role in developing integrated spatial management plans (e.g. for coastal zone, wetland, river basin, watershed) and in advocating for the resilience of fisheries

resources and reliant communities in the context of climate mitigation and adaptation measures applied by other sectors. Such coordination with other policy domains could ensure that climate and other important considerations for the sectors are not overlooked in related legal and policy spheres. It would also facilitate integration of other sectoral conditions and information into fisheries decision-making (FAO, 2016j).

As previously noted, FAO developed *A how to guide on legislating for an Ecosystem Approach to Fisheries*, which outlines 17 minimum components. In addition to institutional coordination and decentralization and the inclusion of relevant principles in legislation, other relevant components include the creation of mechanisms for the integrated management of aquatic ecosystems, control mechanisms for fisheries operations, and implementation of FMPs. The Guide is a useful resource for a review of legislation in this area. These components provide innovative ideas on how to legislate for EAF implementation and represent a range of approaches, while also reflecting some common patterns and trends. The list of minimum components in the Guide represents a suggested floor, not a ceiling, for legal practitioners to legislate in support of EAF implementation (FAO, 2016j).

One example of the legislative application of EAF is Costa Rica's *Decree Nº 37 587/MAG – Plan Nacional de Desarrollo de La Pesca y la Agricultura de Costa Rica (PNDPA) (2013)*, which includes provisions for the National Plan for the Development of Fisheries and Aquaculture to undertake investigations and recommendations on adaptation to climate change (Annex, Sect. VII(A)).

Another example is Angola's *Law 6-A/04 on Aquatic Biological Resources (2004)*, which includes the long-term conservation of aquatic ecosystems, in particular fragile ecosystems, as one of the objectives of fisheries planning, within the overall objective to achieve the restoration and rehabilitation of degraded ecosystems at national, regional and global levels. An interesting provision requires the ministry to set TACs on an annual basis, which can however be reduced if scientific data shows that the species in question is declining, or when there are other environmentally justifiable reasons. Based on the TACs, the ministry

shall set fishing quotas for industrial and semi-industrial right holders (Article 9(a), Article 64(g) and Article 67(2)(d)).

6.4.2. Adaptive management

The concept of adaptive management was first developed to address decision-making in a context of uncertainty. It is a structured and iterative process which aims to optimize decision-making and decrease uncertainty over time. Adaptive management can be described as “learning by doing” and is considered – alongside the precautionary approach – a valuable method for addressing uncertainty when implementing EAF within a complex fisheries system. It allows for the incorporation of feedback from the fisheries system in order to revise policy and management systems. Revisions are then followed by further implementation and experimentation, shaping subsequent policy and management actions (FAO, 2009b).

With regards to fisheries, adaptive management aims to manage biological and abiotic resources (including the climate) in light of scientific uncertainty. As defined in the *Protocol Amending the Agreement Between The United States of America and Canada on Great Lakes Water Quality, 1978 (Great Lakes Water Quality Protocol of 2012)*, adaptive management demands cyclical processes that assess, monitor and review the effectiveness of actions and consequently alter future actions as outcomes and ecosystem processes become better understood. To implement adaptive management, regulators may consider expanding the mandates of fisheries authorities by adding the duty to regularly track and review the impact of relevant policies, of FMPs and related plans, and management decisions. These processes are undertaken in consultation with relevant stakeholders and local communities and in coordination with all relevant national, regional and local agencies, including climate change and disaster management agencies. Such mandates can build on existing decision cycles for setting TACs and promulgating other conservation and management measures. For instance, signing a long-term fisheries access agreement with a third party country that does not allow for re-evaluation of ‘surplus catch’ nor contractual renegotiation to reflect the changing realities would not be consistent with the core

spirit of adaptive management. The impacts of such access agreements on the vulnerabilities of fish stocks and dependent communities to climate change should also be monitored and considered during scheduled reviews.

One example of legislation integrating adaptive management is Section 64 of New Zealand's *Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act (No. 72 of 2012, amended 2013)*. It operationalizes the approach by "allowing an activity to commence on a small scale or for a short period so that its effects on the environment and existing interests can be monitored". Assessed effects then inform the consideration of whether to continue or not the allowed activity, with or without modifications. In addition, Section 64 allows authorities to impose conditions on regulated activities (including seabed-affecting activities, vibration-causing activities with likely adverse effects on marine life) so that they are to be undertaken in stages. Parameters for contingent stages can include restricting boundaries on the temporal duration, the spatial area, the scale, the intensity or the nature of the activity.

Another important feature of effective adaptive management is the identification of clear trigger points at which decisions must be reviewed. To ensure that the decision-making system is iterative, yet vigilant, establishment of clear thresholds for corrective action can ensure that adaptive responses are considered and taken without delay. Legal triggers for reconsideration of resource conservation and management measures, as well as licenses and operational conditions in response to new information, can keep fisheries decision-making evidence-based and up-to-date. Triggers define qualitative and/or quantitative values where monitored indicators suggest when it may be necessary for the adopted actions to be abandoned, amended or supplemented to meet regulatory performance goals (for example, see the Adaptive Management Plan of the Salt River Ecosystem Restoration Project, Ferndale, California).

As an example of management triggers for fisheries, in 2003 the Department of Primary Industries and Resources in the Government of South Australia included reference points to measure the status and

productivity of prawn stock in its management plan for prawn fisheries in South Australia. When real-time monitoring detects critically low stock, the Fisheries Management Committee needs to consult with the prawn industry and the government on the need for alternative management actions, including potential suspension of harvest. Committee meetings are held regularly throughout the prawn fishing season to ensure that response actions occur as quickly as possible (Department of Primary Industries and Resources. 2003). Conversely, triggers can also allow for proportionate resource allocation in the opposite direction.

Moreover, adaptive management should be instituted and operationalized in a way that aims to reduce uncertainty and increase learning, including through EAF research programmes. Fisheries legislation can mandate the establishment of knowledge sharing platforms and networks where local marine area managers can share their management experience and learn from one another.³¹ Creation of an easily accessible and user-friendly knowledge management system, e.g. an online database, could be explored to promote institutional memory and dissemination of useful information.

6.4.3. Co-management/community-based management

Co-management in fisheries is an arrangement where responsibilities and obligations for sustainable fisheries management are negotiated, shared, or delegated between government and non-governmental entities. The co-management approach typically includes a partnership with a local community of resource users. The arrangement can include a combination of customary management practices and more formalized systems, potentially involving non-governmental organizations, academia, and other stakeholders. Stakeholders can include the commercial fishing industry, recreational fishers, indigenous and traditional fishers and other key stakeholders such as conservation groups (Neville, 2008). Since management decisions are made at the local level, this approach can be more responsive to climate change risks

³¹ One example of such a network is the Locally Managed Marine Areas Network, at <http://lmmnetwork.org/>

and to the priorities of indigenous, traditional and small-scale fishers, as well as be easily adapted to local realities and constraints. Furthermore, implementation of co-management can improve resilience through the strengthening of local user rights, national support to community-based initiatives, and increased local management capacities.

Co-management thus places local coastal governments and communities at the forefront of both resource management and climate change adaptation, which in turn increases the likelihood that sustainable resource management and climate change considerations are integrated into local adaptation plans and resource management strategies. Locally developed, decentralized resource management can be institutionalized by laws and regulations that ascribe empowerment and accountability to local bodies.

As an example, in the United Republic of Tanzania, the *Fisheries Act (No. 22 of 2003)* empowers fisheries stakeholders to form community-based groups known as beach management units (BMUs) in marine coastal areas by entering into management agreements with the Director of Fisheries (Section 18). Management agreements establishing a BMU shall define its jurisdictional area (fish landing station). A BMU shall, amongst other issues: a) develop a BMU fisheries management and landing station development plan which fits in with higher level fisheries management plans; b) develop annual and quarterly work plans and budgets to implement management and development plans; c) collaborate in the collection of fisheries catch, effort and value information; d) engage in monitoring, control and surveillance within the BMU area; e) resolve conflicts; f) participate in selection processes for the granting of fishing vessel licenses and fishing permits within the BMU jurisdictional area; and g) arbitrate to settle fisheries disputes between BMU members, between BMUs and between the BMU and other institutions (FAO, 2016j).

Enabling legislation may be required to establish local bodies, such as municipal resource management councils, that ensure fair representation of women, marginalized groups and other stakeholders, and that operate under legitimate procedures for selection of leaders, decision-making

and appeals. In addition, regulations that clearly demarcate management areas, define membership eligibility, monitor local management arrangements, resolve conflicts, and penalize infractions can greatly contribute to successful and climate-responsive implementation of co-management. Legal guidelines on steps towards meaningful stakeholder consultations, community capacity building, and collective empowerment can also be helpful (FAO, 2016j).

In Japan, coastal fisheries are governed by fishery cooperative associations (FCAs) whose members are mostly fishing households and “small” companies, as defined by the number of employees and gross tonnage of the vessels owned (FAO, 2008b). The 1948 *Fisheries Cooperative Association Law* established the legal foundation of FCAs. The functions of FCAs are similar to other harvester cooperatives and include joint purchases of inputs (e.g. fuel, ice and boxes), administration of ex-vessel markets, and provision of insurance and credit to members. FCAs also keep catch records, used to provide official statistics. In addition to such conventional functions, FCAs manage fishing rights, analogous to territorial use rights for fishing (TURFs) which are granted by the government and protected by law. These two institutions, FCAs and TURFs, form the basis of Japanese fishery co-management (FAO, 2008b).

The success of co-management as an approach to address climate change in fisheries also depends on effective enforcement of locally developed management rules and measures. Legal clarity and certainty with regards to the ownership of fisheries resources, the mechanisms for allocating fishing rights, and enforcement of user rights can be secured through reviews and iterations of national fisheries legislation (Pomeroy, Katon and Harkes, 1998). Coordinated enforcement efforts between local informal enforcers (e.g. senior fishers, local leaders) and formal enforcers (e.g. police, coast guard) can increase compliance in cases where socio-cultural mechanisms that regulate behaviours (e.g. moral obligation, local solidarity, social exclusion) fall short (Pomeroy, Katon and Harkes, 1998).

Co-management arrangements are also considered good practice for small-scale fisheries management in face of climate change (FAO,

2013e). Under the FAO 2007 pilot project “Sustainable Fisheries Livelihood Programme”, which supported the introduction of co-management arrangements for the large dams (artificial lakes) in Burkina Faso, two management committees were set up in Lake Bagré and Lake Kompienga. These committees include representatives of local administration, the decentralized technical administrations, consular chambers, non-governmental organizations, microfinance institutions, representatives of traditional rulers and representatives of professional associations. The committees have legal and legitimate status to approve and validate co-management plans and rules of procedure, with special commissions created to address specific management issues such as surveillance in fishing camps, establishment of local fisheries management funds, training of committee members and protection of fish habitats by designating fish reproduction zones, as well as conflict resolution. It is reported that these committees played an important role in the management processes, as well as in increasing awareness among national authorities of the need to take the interests of fishing communities into account in fishery management (FAO, 2013e).

6.5. Legislation addressing mitigation in fisheries

The primary source of GHG emissions in the fisheries and aquaculture sectors comes from energy consumption, as outlined previously. Fisheries legislation can provide legal mandates for fisheries authorities to set targets and adopt measures to reduce the sectors’ energy intensity and carbon footprint. Translation of targets into concrete GHG reduction actions for the sector can result in adoption of schemes or measures such as fleet decommissioning, fine-tuning of sectoral fuel subsidy programmes, promotion of energy-efficient technologies, phasing out of harmful refrigerants, and climate labelling, among others. Sector-wide market-based systems that set the overall sectoral emission limits and allow licensed fleets to trade emission allowances specified in their licence conditions can also be established. Moreover, effectively linking mitigation activities in the sector with existing carbon markets can provide additional incentives to invest in sectoral mitigation.

Furthermore, fuel subsidies intended to support fisheries can discourage the promotion of fuel-efficient vessels, gears and operations. FAO points out that fuel efficiency and GHG emissions from fisheries should be considered as an integral part of fisheries management to sustainably reduce fuel use and GHG emission in fisheries (FAO, 2018g). Sectoral plans can set the path for mitigation measures in fisheries. In India for example, the *National Policy on Marine Fisheries (2017)* includes, amongst others, an encouragement to reduce GHG emissions from fishing and fishing related activities (known as ‘green fisheries’). Such plans are important to set a vision for government action, which can then be translated into specific legislation (Section 41 and Section 43).

6.5.1. Measures to promote energy efficiency

Measures to promote energy efficiency and reduce emissions can apply to fishing vessels, merchant shipping vessels and the extractive industries such as marine mining and petroleum. Energy efficiency may be promoted through fuel efficiency standards, vessel size limitations and equipment restrictions for fishing vessels (FAO, 2016j). As an example, the 2002 *Environment Protection and Management Law* of Liberia prescribes that the Environmental Protection Agency shall, in consultation with the line ministry and national maritime organization, issue appropriate regulations to prevent, reduce and control pollution or other forms of environmental damage from, among other sources, vessels, aircraft and other engines used in the coastal zone; and from installations and devices used in the exploration or exploitation of the natural resources of the seabed and subsoil of the EEZ (Section 82).

6.5.2. Energy incentives/subsidies in fisheries

Global fuel subsidies, in the form of tax exemptions and/or direct subsidies, have been estimated at USD 4.2 billion to USD 8.5 billion per year (FAO, 2018g). Whether fuel subsidies have a negative or positive environmental impact depends on the design and target of a subsidy. While fuel subsidies effectively reduce fuel prices for fishers and might encourage increased fuel consumption and reduced fuel efficiency,

governments can also use subsidies to offer positive incentives to promote fuel-efficient technologies that reduce GHG emissions.

Reforming what are generally agreed as being harmful fisheries subsidies has potential to foster climate change and sustainable development goals, by removing incentives that contribute to overcapacity and overfishing, as well as excessive use of fossil fuels, while also freeing up resources that could be invested in climate change adaptation of fishing communities, increased resilience of coastal populations, or used to compensate for climate change related loss and damage. Twenty-two percent of fisheries subsidies go to the purchase of fuel for fishing vessels and to lower the other incidental costs of operating fuel-dependent ships. Reduction of such subsidies would contribute to the goals of mitigating the GHG emissions from the sector by reducing incentives for fuel consumption (Gehring, 2018).

On the other hand, targeting subsidies for the development of renewable energy or energy efficiency would promote the goals of climate change mitigation and of making “finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development” (Article 2 of the PA). As an example of a positive incentive, the Korean Government subsidizes the purchase of LED light equipment for use in fishing, making LED equipment purchasing more affordable with shorter pay-back times for fishers (FAO, 2018g).

6.5.3. Control mechanisms on fishing gear and vessels

Legislation can be used to define, provide for, and/or prohibit certain types of fishing gear and fishing methods in a country. For example, fishing with highly destructive gears and methods such as use of toxic substances, explosives, electricity, fishing with the use of light, beach seines and high seas drift nets of more than 2.5 km in length can be prohibited. Also, there can be provisions aimed at reducing the negative impacts of fishing methods and gear, including to improve selectivity, minimize by-catch, limit habitat degradation and reduce environmental impacts related to pollution and energy usage. While provisions that are unlikely to require frequent amendments may be outlined in the primary

legislation, more specific requirements may be more appropriate for secondary legislation (FAO, 2016j).

In Iceland, the system of individual transferable quotas (ITQs), which has its legal basis in the *Fisheries Management Act (1990)*, makes all fisheries vessels subject to vessel catch quotas. The quotas represent shares in the TAC and are permanent, divisible and freely transferable (Runolfsson and Arnason 1996). The system is reported to have led to a reduction in vessel numbers and capacity which, together with other factors such as technological advances in vessel engine and gear technology, resulted in a reduction of fuel consumption of 35 percent between 1993 and 2011 (FAO, 2018g).

Several other countries have similar control measures enshrined in legislation. For example, in Cameroon, the *Law No. 94/01 regulating Forestry, Wildlife and Fisheries (1994)* provides several restrictions on the use of fishing gear, such as prohibiting trawls and within three nautical miles from the baselines; the manipulation of fishing gear so as to reduce the selectiveness of fishing nets; the use of aqualungs or harpoons when fishing; fishing using fire arms, dynamite, explosives, poison, electricity, light, automatic traps and other means that can be harmful to aquatic species and habitats; and fishing with unregulated mesh size (FAO, 2016j). In the United Republic of Tanzania, the *Fisheries Act (No. 22 of 2003)* provides that the Director of Fisheries may adopt various measures to improve the management of fisheries, such as prohibiting the use of certain types of fishing vessels and gears. The Director may attach multiple conditions to a fishing license, including those related to fishing methods and disposal of fish, use of fishing gear and fishing zones (FAO, 2016j).

6.5.4. Legislation for marine protected areas

In addition to the measures addressing mitigation of emissions, there is increased recognition that responsible and sustainable fisheries and aquaculture are instrumental in conserving and enhancing marine and coastal ecosystems' function as major carbon sinks (Global Ocean Forum, 2016). Fisheries and aquaculture practices can be regulated

more effectively to maintain and improve 'blue carbon' sequestration by wetlands, mangroves, salt marches, seagrass meadows and other important ecosystems. These areas have been shown to have very high rates of sequestration compared to other terrestrial landscapes. The need to map, conserve and restore coastal carbon ecosystems as globally significant long-term carbon sinks has been recognized in the aforementioned *Strategic Roadmap on Oceans and Climate 2016 to 2021*, which pointed out that it can be an opportunity for countries to include these measures as part of their climate change mitigation strategies. Implementation could mean the inclusion of mangroves, saltmarshes and seagrasses in national GHG accounting.³²

The establishment of marine protected areas (MPAs), which are areas of the ocean set aside for long-term conservation, can offer nature-based solutions to support global efforts towards climate change adaptation and mitigation (IUCN, 2017). These MPAs can be instrumental to preserve valuable marine ecosystems that retain blue carbon, while also providing benefits such as the enhancement of fisheries production and resilience to climate change impacts like sea-level rise, ocean warming, changes to ocean circulation and ocean acidification. Additionally, MPAs that include mangroves, seagrasses and salt marshes serve as carbon-sequestering habitats while contributing to other valuable ecosystems (Global Ocean Forum, 2016). In developing protected areas, important elements to consider include: the designation of an authority empowered to establish the protected area; determining the type(s) of protected areas (e.g. conservation, sustainable use, etc.) and describing their associated levels of protection (e.g. marine reserves, marine parks, marine sanctuaries, or MPAs); establishing a process for nominating, creating and managing a protected area, including stakeholder participation, particularly of local communities, and consultation and coordination with authorities at the national and local levels; determining the level of protection and activities that may be prohibited or restricted; and setting implementation and enforcement measures, which may involve national or local government levels, and cooperation with local communities (FAO, 2016j).

³² These ecosystems can be incorporated into mechanisms such as REDD and NAMAS too.

An example of legislation in this area is Canada's *Oceans Act* (S.C. 1996, c.31), which envisions MPAs as areas within internal waters, the territorial sea or the EEZ that have been designated for: a) the conservation and protection of commercial and non-commercial fishery resources, including marine mammals, and their habitats; b) the conservation and protection of endangered or threatened marine species and their habitats; c) the conservation and protection of unique habitats; d) the conservation and protection of marine areas of high biodiversity or biological productivity; and e) the conservation and protection of any other marine resource or habitat as is necessary to fulfil the mandate of the Minister (Section 35). The MPAs form part of the plans for the integrated management of activities or measures in or affecting estuaries, coastal waters and marine waters, mandated by Section 31. In implementing this provision, Section 35.2 mandates the Minister to lead and facilitate the development and implementation of a national system of MPAs, in collaboration with other ministers, boards and agencies of the government, provincial and territorial governments and affected aboriginal organizations, coastal communities and other persons and bodies. The process to establish MPAs under the Act includes a proposal of the MPA's design and regulations to be developed according to the state of the ecosystem in the area, based on best available science, traditional and local knowledge, community-based monitoring and other sources of information. Consultation occurs with affected and interested parties on the conservation objectives, the regulatory measures and the boundary (and zoning, if applicable). An assessment report analyses the proposed conservation objectives of the MPA, and then regulatory measures are developed. The selection of activities that are to be allowed and the conditions under which they would be carried out are determined based on the level of risk associated with these human activities to the achievement of the MPA conservation objectives. The process also involves the development of a Strategic Environmental Assessment, a Cost/Benefit Analysis, the Regulatory Impact Analysis Statement, as well as an MPA management plan which must include an MPA monitoring plan (with monitoring indicators, protocols and strategies); compliance and enforcement; and public education and outreach (Government of Canada, 2019).

Of note, FAO recognizes that having clear tenure arrangements is a critical element in MPA planning and implementation, especially regarding coastal zones. FAO also recognizes that the practice in establishing MPAs should move towards greater equity and participation, both as an end in itself and as a means to more sustainable conservation and management (FAO, 2013e). In the Gabon, the *Code of Fisheries and Aquaculture of 2005* provides for the rights of coastal populations to initiate the process of classifying (or declassifying) an area as an MPA. Their rights are similar to those of the fisheries authorities in this respect. When identifying the perimeters of an MPA and mapping the nature of customary rights and other activities in the area, the authorities shall cooperate with the local population. For this purpose, consultative commissions shall be established, whose composition, organization and duties shall be provided for in regulations (FAO, 2016j).

6.6. Aquaculture legislation and climate change

6.6.1. General considerations

Aquaculture is defined as the farming of aquatic organisms in inland or coastal areas, involving intervention in the rearing process to enhance production and which is characterized by individual or corporate ownership of the stock being cultivated (FAO, 2003b). As noted by FAO in 2008, wild capture fisheries and aquaculture are fundamentally different from other food production systems when it comes to linkages and responses to climate change (FAO, 2008c).

The regulation of aquaculture activities is important both for mitigation and, increasingly, for adaptation to climate change (and its role in safeguarding food security in a context of a changing climate). Aquaculture remains the fastest growing global food production system, having grown at a mean annual rate of 7.7 percent between 1950 and 2015 and reaching 80 million tonnes of food fish and 30.1 million tonnes of aquatic plants in 2016. Climate change is projected to affect aquaculture significantly, with major impacts being related to losses of production and infrastructure from extreme events such as floods and

increased risk of diseases, parasites and harmful algal blooms. In the long term, the sector is projected to witness reduced availability of wild seed as well as increasing competition for freshwater due to a reduction in precipitation and changes in temperature, etc. Accordingly, aquaculture has been recognized by many countries in their NDCs, with 19 referring to aquaculture or fish farming. Of these, 9 focused on adaptation to climate change, while 10 included proposals to use the development of aquaculture as an adaptation and/or mitigation measure.

The considerations made in the previous sections, such as governance of tenure and DRR/DRM, may also be relevant for aquaculture. Furthermore, similarly to the EAF, the Ecosystem Approach to Aquaculture (EAA) is also a key policy concept in enabling climate change responses in the sector. The EAA is seen by FAO as a strategy that aims to integrate aquaculture activities within their surrounding ecosystems with the goal of achieving sustainable development, equity and resilience of interlinked social-ecological systems (FAO, 2010b). This subsection will look into aquaculture-specific considerations in more detail.

Among options for adaptation and building resilience in aquaculture, FAO recommends the following measures:

- improved management of farms and choice of farmed species;
- improved spatial planning that takes climate-related risks for farms into account, including integration of aquaculture into holistic, multi-sectoral watershed and coastal zone management and adaptive planning;
- improved environmental monitoring systems;
- disaster risk reduction and management.

(FAO, 2018g)

From the point of view of mitigation, aquaculture, like capture fisheries, is not a major global source of GHG emissions, with sectoral emissions estimated at around 7 percent of those from agriculture overall (including emissions from feeds). Potential measures to mitigate the

sector's impact include:

- reduction of GHG emissions in the aquaculture production chain, such as improving efficiency of input use (e.g. better technologies), shifting energy supply (from fossil fuel to renewable), adopting best practices (improving feed conversion rates), and replacing fish-based feed ingredients with crop-based ingredients, reducing nitrogen emissions from fish farms, and improving fish health (which can reduce the overall carbon footprint of production per unit at farm level);
- development of agro-aquaculture production systems, such as integrating rice and fish aquaculture production, which is shown to be sustainable and efficient from a natural resource use perspective, and also reduce overall emissions (depending on specific contexts);
- protection of fragile ecosystems often affected by aquaculture, like mangroves, which are important carbon sinks.

(FAO, 2018g)

Article 9.1.1 of the *Code of Conduct for Responsible Fisheries* indicates the need for states to develop an appropriate legal and administrative framework for the development of responsible aquaculture. The ability to develop sustainable aquaculture operations depends on the establishment of a number of institutional and regulatory preconditions. At a general level, it is recommended that governments develop legal and institutional instruments to:

- recognize aquaculture as a distinct sector;
- integrate aquaculture concerns into resource use and development planning;
- improve food safety and quality to safeguard consumers and meet the standards of importers; and
- improve the management of aquaculture, particularly where it has the potential to be socially or environmentally unsustainable.

(FAO, 2013f)

At the same time, given that aquaculture is affected by a variety of issues, legislation that is of relevance to aquaculture might address issues such as the use of freshwater resources, environmental protection issues, food safety, fish health and land tenure (FAO, 2002b). Indeed, many of the laws and regulations in place may not apply directly to aquaculture. This sometimes leads to inconsistency in their application to the sector, as well as contradictions amongst legislative provisions and mandates (FAO, 2013f).

Despite these limitations, aquaculture laws and regulations across the globe have developed some commonality in terms of approach and the required minimum elements. Numerous countries have enacted specific rules under aquaculture specific laws, a main fisheries law, water law, or other piece of primary legislation. These laws tend to set out the guiding principles for aquaculture activities and invest an authority with the power to regulate aquaculture. It has become common to regulate capture fisheries and aquaculture in the same piece of legislation (with a specific section devoted to aquaculture, for instance), even though aquaculture as an activity has more affinities with agriculture than with capture fisheries. In countries where the aquaculture sector is emerging, governments find it useful to have the same authority enforce and control both the fisheries and aquaculture sectors. However, from a legal point of view, it is recommended to separate the two, as an existing fisheries law often does not form an adequate basis for regulating aquaculture (FAO, 2013f).

Indeed, it is the position of this Study that developing specific aquaculture legislation leads to greater clarity and effectiveness in the regulation of the sector, and to better integration of concerns such as climate change. Integrating climate change considerations into such legislation would not only lead to greater sectoral mitigation results (e.g. from improved feed production and use practices) but also to increased resilience and adaptation of coastal ecosystems and communities (e.g. protection of mangroves as the source of food and income for the local population) (FAO, 2013f).

A recognized trend in aquaculture sector legislation is the objective to develop the industry in a manner that is environmentally and economically sustainable. For example, the *1995 Guidelines for Sustainable Development and Management of Brackish Water Aquaculture* in India, recognize the need for measures to promote sustainable aquaculture development and to reduce or eliminate the environmental impacts of the industry. In the Philippines' *Fisheries Code of 1998 (Republic Act No. 8 550)*, a code of practice for aquaculture, outlines principles and guidelines to promote the sustainable development of the industry. Similar statements of principle as to the concept of sustainable development can be found in other aquaculture laws, such as Peru's 2001 *Ley N° 27 460 de promoción y desarrollo de la acuicultura*, and in government policies and programmes like Mexico's Programa de Pesca y Acuicultura of 1995-2000 and Vietnam's Aquaculture Development Programme for 1999-2010 (FAO, 2002b). Such references to sustainable development in legislation, which can be further developed in secondary legislation as the examples here show, might be a way to orient the sector towards sustainability overall, but also to achieve better climate change related outcomes.

6.6.2. Aquaculture authorities

Public sector institutions play an important role in each stage of aquaculture development. As already mentioned, aquaculture is often regulated under a specific legal instrument (or more than one), and is also placed under the mandate of a specific authority (FAO, 2013f).

Clear legislative provisions prescribing the legal duties of a specialized aquaculture agency, accompanied by provisions on transparency and public participation, is advisable. Such a dedicated agency would be in a position to acquire a specialized and holistic picture of aquaculture operations and could serve as an advocate for considering the impacts of climate change on aquaculture activities in all relevant public decision-making in an integrated manner. In addition, in order to work effectively, the aquaculture management system needs inter-institutional cooperation and coordination, along with skilled public and private personnel with adequate financial resources to implement, monitor

and enforce the legislation and the regulations that flow from there (FAO, 2018g).

An example of a dedicated aquaculture authority is the *National Aquaculture Development Authority of Sri Lanka Act (No. 53 of 1998)*. The Authority's functions, as established in the Act, are: to develop aquatic resources and the aquaculture industry, with a view to increasing fish production in the country; to promote the creation of employment opportunities through the development of freshwater aquaculture, coastal aquaculture and sea farming; to promote the farming of high valued fish species including ornamental fish, for export; to promote the optimum utilization of aquatic resources through environmental friendly aquaculture programmes; to promote and develop small, medium and large scale private sector investment in aquaculture; to manage, conserve, and develop, aquatic resources, and the aquaculture industry, and to conserve biodiversity. The Authority's management also has a coordination component, as it is to be administered by a Board of Directors from the line ministries responsible for fisheries and aquatic resources development, irrigation, "Mahaweli development", agriculture, wild life conservation, environment, and finance.

6.6.3. Legislation for adaptation in aquaculture

Turning to measures that can support adaptation to climate change in the aquaculture sector, it is recommended to draft a legislative framework that ensures adequate protection of tenure rights, deals with planning and access to land, water and natural resources, water management and waste water, seeds, feed, investment, and contemplates food safety and disease control. Self-regulation through voluntary codes of practice and standards could be encouraged, when appropriate, and environmental sustainability and social responsibility should be emphasized (FAO, 2013f).

Common issues that arise in the regulation of aquaculture activities are:

- Providing aquaculture operators with secure tenure rights to conduct aquaculture operations on the property where the fish

farm will be located. In this regard, key issues to consider will be: the extent to which the land rights for aquaculture impose environmental and social requirements upon the land owner; whether legislation allows for integration of aquaculture and agriculture; and what rights of access to water exist.

- A licensing system (including different possibilities such as authorizations, permits or licenses) which provides:
 - the government with the legal basis to control all aquaculture operations, and to supervise their environmental impacts;
 - farmers with a clear right to operate the aquaculture facility, as long as the operator complies with the terms of the permit, the relevant environmental laws, and any applicable codes of aquaculture practice;
 - environmental sustainability of aquaculture by examining the suitability of proposed fish farm locations, and the potential environmental effects of their operations;
 - the institutional framework and orientations for the management of aquaculture activities, including formalities related to certain procedures.

(FAO, 2013f)

With regard to a licensing system, in order to increase even further the possibility for positive climate change outcomes in terms of adaptation and mitigation, certain preconditions for the issuance of a license can be set, such as compliance with environmental and waste disposal regulations.

An example of a comprehensive piece of legislation that includes these aspects is the Australian (South Australia) *Aquaculture Act (2001)*. The Act includes provisions giving the South Australian Minister for Agriculture, Food and Fisheries the powers to grant and make decisions on license and lease conditions. The Act also establishes bodies to administer or advise on aspects of the Act, as well as giving legal authority for associated activities. The administrative responsibilities under the Act have been

delegated to the Department of Primary Industries and Resources South Australia. The Act grants the Governor the power to make regulations with regard to the matters stated in the Act. Furthermore, it creates a licensing system, whereby an application for an aquaculture license must meet relevant policy objectives and will be assessed by the Department to determine the likely environmental impact the proposal will have on the seabed and surrounding area. When considering the environmental issues associated with an application within a zone, the Department will take into account: i) the demonstrated level of commitment and knowledge of the applicant to ensure the operations of the site are managed in an environmentally sustainable manner; and ii) the operator's capacity for the implementation, analysis and reporting of environmental monitoring programmes in marine environments.

Other countries that employ a regulated licensing system for aquaculture include Cambodia, Canada, the Republic of Korea, Gabon, Madagascar, Norway and Zambia (FAO, 2002b).

- A system of impact assessment (FAO, 2013f)

Both in developed and developing countries, EIAs are increasingly required before aquaculture farms may be established or operated, to prevent environmentally unsustainable developments. For example, the EIA will address issues such as the proposed size of the aquaculture farm and the ecological/environmental sensitivity of the area involved. The *National Environment Act (No. 13 of 1994)* of The Gambia and the *Environment Protection Act of the Seychelles, 1994* (now replaced by the *Environment Protection Act, 2016*) are both good examples – they both contain detailed regulations on carrying out an EIA before initiating aquaculture projects in sensitive areas. Also, the *1997 Environment Protection Act* of Mozambique requires an environmental licence and a mandatory EIA submission for marine and freshwater aquaculture projects (FAO, 2002b).

- Integrating the aquaculture sector into coastal area management

Balancing the diverse interests involved in aquaculture is a complex task. Increasingly, integrated coastal management is

seeing the inclusion of aquaculture activities in the equation. Various tools are commonly used for this purpose, including EIAs, the creation of protected areas, restrictions on private ownership, and recognition of indigenous rights and zoning, whereby land and water areas are set aside for certain types of aquaculture. Such an approach may also include:

- regulation of effluents, waste, including of drug and chemical use;
- regulating escapement (i.e. the escape of fish from aquaculture facilities leading to genetic pollution of the natural environment), which includes provisions on reporting and informing about incidences of escapement – examples of countries that adopt this type of legislation include Canada, Norway and Zambia;
- regulating trade and health issues, including food safety; and
- providing financial incentives that make the operation financially sustainable.

(FAO, 2013f)

An example of such integration is found in the *Belize Coastal Zone Management Act* (1998), which specifically requires the inclusion of aquaculture interests in Coastal Zone Management Plans. Another example is the *Philippines' Fisheries Code of 1998 (Republic Act No. 8 550)* which declares that it will be state policy to

manage fishery and aquatic resources, in a manner consistent with the concept of an integrated coastal area management in specific natural fishery management areas, appropriately supported by research, technical services and guidance provided by the State.

The Australian (Tasmania) *Marine Farming Planning Act (1995)* provides for the designation of Marine Farming Development Plans of areas where marine farming may occur. The Plans are developed following a process of public consultation that takes account of the physical suitability of potential aquaculture sites, the current legal situation, and the desire to minimize impacts on other users of the coastal zone (FAO, 2013f).

As discussed in the preceding sections, integrated approaches to coastal zone management have many climate change related potential benefits, such as allowing for disaster risk planning, more efficient use of resources and harmony between different uses of the land and associated water resources.

6.6.4. Legislation for climate change mitigation and aquaculture

For the most part, GHG emissions from aquaculture are greatest as a result of intensive production of finfish and crustaceans, which is heavily reliant on feeds and aeration. Integrated food production systems such as that of fish with rice, and shrimp-mangrove cultivation can substantially reduce overall GHG emissions from aquaculture production systems (FAO, 2018g). Legislation can be instrumental to operationalize such issues, for example by establishing criteria and standards that can be applied to the issuance of licenses and authorization procedures for fish farms, as well as criteria on feed requirements and farm management. Furthermore, legislation governing land and agriculture might be useful in supporting (or even allowing) this integration of aquaculture and agriculture.

Protection of fragile ecosystems such as mangroves, which are often cleared to facilitate aquaculture operations, is another example of an area where legislation is key. The Barbuda (*Coastal Zoning and Management Regulations, 2014 (S.I. No. 34 of 2014)*) are a good example, as is the Guatemala *Reglamento para el aprovechamiento del manglar (Resolución N° 1.25/98)* (FAO, 2002b).

6.7. Concluding remarks

In this Chapter, we have looked at the specificities of the fisheries and aquaculture sectors and the impact of climate change on these sectors, as well as their contribution thereto. Unlike other sectors addressed in this Study (i.e. agriculture and forestry), the fisheries and aquaculture sectors are responsible for relatively fewer total GHG emissions, yet they are still considered, as part of the global effort encouraged by the UN Secretary-General, to have the responsibility to contribute to the global fight against

climate change. At the same time, these sectors are highly vulnerable to climate change, making adaptation efforts a key priority, given their fundamental contribution to global food security and livelihoods.

The impact of climate change on fisheries is being increasingly reported and recognized by authoritative scientific sources. A first step to strengthen legislation for mitigation and adaptation in this sector may be to raise awareness through increased dissemination of information on the specificities of the threats to different fish species and their environments, to guide policymakers, as well as the public in general, and serve as the basis for adequate planning and legislation.

Legislating to integrate climate change related goals into fisheries management will be instrumental to avoid or minimize further risks that are anticipated for this sector. The examples we have described show that there is scope for adapting existing legal and institutional structures to include climate change related goals into the fisheries sector. In terms of adaptation, legislative priorities are not dissimilar to existing priorities of sustainable economic development and sustainable use of resources. Fostering a flexible and responsive approach to fisheries and aquaculture management, including key sustainability considerations such as a precautionary approach, an EAF and EAA, as well as adaptive management practices, are all features of existing national policy frameworks. Legislation in these areas will serve to solidify mandates of institutions, clarify duties and rights, and enable good practices.

Last but not least, although relatively small global contributors to climate change, capture fisheries and aquaculture have a responsibility to limit GHG emissions as much as possible. A significant reduction of GHG emissions and enhancement of blue carbon sinks can be achieved with the measures that have been outlined, supported by appropriate legislation to operationalize them.

As explored in Chapter 3, all these legislative measures should be preceded by a thorough analysis of the whole legal framework to identify the gaps and opportunities in each context and to determine which ones should be addressed as priorities to support the achievement of the policy goals for fisheries and climate change.

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- Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa, adopted by the Second Ordinary Session of the Assembly of the Union in Maputo, 11 July 2003, entered into force on 25 November 2005.

Agreement for the Establishment of the General Fisheries Commission for the Mediterranean, adopted 24 September 1949, Rome.

- Resolution GFCM/41/2017/5 on a network of essential fish habitats in the GFCM area of application.

American Convention on Human Rights, also known as the Pact of San José, adopted on 22 November 1969 in Costa Rica, entered into force on 18 July 1978.

Aquatic Animal Health Code of the World Organisation for Animal Health (OIE). The Code is published annually with standards adopted by the World Assembly of OIE Delegates. Its current edition (22nd) was adopted at the eighty-seventh General Session in May 2019.

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, adopted on 22 March 1989 by the Conference of Plenipotentiaries in Basel, Switzerland.

Central American Convention for the Protection of the Environment (CPC), 1989.

Convention Concerning the Protection of the World Cultural and Natural Heritage, adopted at the seventeenth session of the General Conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) meeting in Paris, 16 November 1972.

Convention for the Conservation of the Biodiversity and the Protection of Priority Wilderness Areas in Central America, was adopted on 5 June 1992 and entered into force on 20 December 1994.

Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention), adopted on 25 June 1998 and entered into force on 30 October 2001.

Convention on Biological Diversity (CBD), adopted in Nairobi, 22 May 1992, opened for signature at the United Nations Earth Summit in Rio de Janeiro, and entered into force on 29 December 1993. The CBD has two supplementary agreements - Cartagena Protocol and Nagoya Protocol.

- Decision XI/11 on New and emerging issues relating to the conservation and sustainable use of biodiversity, adopted at the Conference of the Parties to the CBD (UNEP/CBD/COP/DEC/XI), 8–19 October 2012, in Hyderabad, India.
- Decision X/2 on the Strategic Plan for Biodiversity 2011-2020 (including Aichi Biodiversity Targets). Adopted and revised at the Tenth meeting of the Conference of the Parties to the CBD, held from 18 to 29 October 2010, in Nagoya, Aichi Prefecture, Japan.
- Decision XIII/3 on Strategic actions to enhance the implementation of the Strategic Plan for Biodiversity 2011-2020 and the achievement of the Aichi Biodiversity Targets, including with respect to mainstreaming and the integration of biodiversity within and across sectors.
- Decision XIII/4 on Biodiversity and climate change, adopted on 10 December at the Thirteenth meeting of the Conference of the Parties to the CBD, 4–17 December 2016, in Cancun, Mexico (CBD/COP/DEC/XIII/4).
- Decision XIII/15 on Implications of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) assessment on pollinators, pollination and food production for the work of the Convention, adopted at the Thirteenth meeting of the Conference of the Parties to the CBD, 4–17 December 2016, in Cancun, Mexico.

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European Convention on Human Rights, also known as the Convention for the Protection of Human Rights and Fundamental Freedoms, was opened for signature in Rome on 4 November 1950 and came into force in 1953.

- Protocol 1 to the European Convention for the Protection of Human Rights and Fundamental Freedoms, also known as the Paris Protocol, open for signature on 20 March 1952 by the members of the Council of Europe and entered into force 18 May 1954.

General Agreement on Tariffs and Trade (GATT), adopted by the UN Conference on Trade and Employment on 30 October 1947, came into force on 1 January 1948. The World Trade Organization (WTO) is the successor to the GATT, which is still in effect under the WTO framework, subject to the modifications of GATT 1994.

- Agreement on Agriculture, adopted during the Uruguay Round of negotiations 1986-1994, came into force on 1 January 1995.
- Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), adopted during the Uruguay Round of negotiations 1986-1994, came into force on 1 January 1995.
- Agreement on Subsidies and Countervailing Measures (SCM Agreement), adopted during the Uruguay Round of negotiations 1986-1994, came into force on 1 January 1995.
- Technical Barriers to Trade Agreement (TBT), adopted during the Uruguay Round of negotiations 1986-1994, came into force on 1 January 1995.

Indigenous and Tribal Peoples Convention, 1989 (No. 169), adopted 27 June 1989 at the General Conference of the International Labour Organization (ILO), entered into force 5 September 1991.

International arrangement on forests beyond 2015, adopted by the Economic and Social Council, Resolution E/RES/2015/33, 22 July 2015.

International Convention for the Protection of New Varieties of Plants (UPOV Convention), adopted by a Diplomatic Conference in Paris on December 2, 1961 and revised in 1972, 1978 and 1991.

International Covenant on Civil and Political Rights (ICCPR). UN General Assembly resolution 2200A (XXI), adopted 16 December 1966 and in force from 23 March 1976 in accordance with Article 49 of the covenant.

International Covenant on Economic, Social and Cultural Rights (ICESCR), adopted by the UN General Assembly on 16 December 1966 through GA Resolution 2200A (XXI), and entered into force on 3 January 1976.

International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), adopted by the thirty-first session of the FAO Conference on 3 November 2001.

Kyoto Protocol to the United Nations Framework Convention on Climate Change, adopted in Kyoto 11 December 1997.

- Doha Amendment to the Kyoto Protocol, adopted 8 December 2012. It will enter into force after reaching 143 acceptances of the Amendment; as of February 2020, 137 parties had officially accepted.

Non-legally binding instrument on all types of forests, adopted by the Sixty-Second Session of the United Nations General Assembly in 2007 under Resolution A/RES/62/98. Renamed the United Nations Forest Instrument in 2016 under Resolution A/RES/70/199.

Protocol Amending the Agreement Between the United States of America and Canada on Great Lakes Water Quality, 1978, as amended on 16 October 1983 and on 18 November 1987 (Great Lakes Water Quality Protocol of 2012).

Ramsar Convention on Wetlands of International Importance, Especially as Waterfowl Habitat, now called the Convention on Wetlands, was adopted on 2 February 1971 at Ramsar, Iran and entered into force on 16 May 1976.

Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean, adopted on 4 March 2018 at the ninth meeting of the negotiating committee of the Regional Agreement held in Escazú, Costa Rica. Ratified by 8 Parties, not yet in force. United Nations Treaty Collection [cited 17 April 2020].

Regional Convention for the management and conservation of natural forest ecosystems and the development of forest plantations (Convenio Regional para el Manejo y Conservación de los ecosistemas naturales forestales y el desarrollo de plantaciones forestales), adopted on 29 October 1993 and entered into force on 15 October 1999.

Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, adopted on 10 September 1998 by the Conference of Plenipotentiaries on the Convention in Rotterdam, the Netherlands.

Stockholm Convention on Persistent Organic Pollutants, adopted on 22 May 2001 at the Conference of Plenipotentiaries on the Stockholm Convention on Persistent Organic Pollutants, Stockholm, 22-23 May 2001.

Terrestrial Animal Health Code of the World Organisation for Animal Health (OIE). The Code is published annually with standards adopted by the World Assembly of OIE Delegates. It is a key part of the WTO legal framework for international trade and its current edition (28th) was adopted at the eighty-seventh General Session in May 2019.

United Nations Convention on the Law of the Sea (UNCLOS), adopted at Montego Bay, 10 December 1982.

United Nations Convention to Combat Desertification (UNCCD) in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, adopted by the Intergovernmental Negotiating Committee of the General Assembly on 17 June 1994, entered into force on 26 December 1996, in accordance with Article 36(1).

United Nations Forest Instrument, adopted by Seventieth Session of the United Nations General Assembly, Resolution A/RES/70/199, 2016. Renamed from previous 2007 Resolution A/RES/62/98.

United Nations Framework Convention on Climate Change (UNFCCC), adopted at the Rio Earth Summit in 1992. To date, 197 parties (196 States and 1 regional economic integration organization) have accepted the Framework [cited April 2020].

- Decision 2/CP.15, taking note of the Copenhagen Accord at the fifteenth session (COP15) of the Conference to the Parties on 18 December 2009. FCCC/CP/2009/11/Add.1.
- Warsaw Framework for REDD+, adopted by the Conference of the Parties to the UNFCCC (COP 19), held in November 2013 in Warsaw, Poland.
- Decision 1/CP.17. Negotiations began for a new legal instrument in Durban in 2011, which culminated in the adoption of the Paris Agreement in 2015.
- Paris Agreement (PA), adopted in 2015 by the Conference of the Parties to the UNFCCC. Date of entry into force: 4 November 2016 (Decision 1/CP.21). To date, 195 Parties have signed the Paris Agreement and 189 Parties have ratified it. Depository, United Nations Treaty Collection Chapter XXVII 7.d [cited April 2020].
- Decision 1/CP.21. All Parties are requested to submit the next round of NDCs by 2020 and every five years thereafter. FCCC/CP/2015/10/Add.1.
- Decision 1/CP.23. Article 14 of the PA: The Talanoa Dialogue was adopted on 18 November 2017 at the twenty-third session of the Conference of the Parties (COP23). The Dialogue, which was preceded by a non-formal 'facilitative dialogue', was launched in January 2018 to aid Parties to the PA with the Global Stocktake, scheduled to take place in 2023.
- Decision 2/CP.23. Local communities and indigenous peoples platform, adopted by the Conference of the Parties on its twenty-third session (COP23), held in Bonn from 6 to 18 November 2017.

- Decision 4/CP.23. Adoption of the Koronivia Joint Work on Agriculture (KJWA), adopted by the Conference of the Parties to the UNFCCC at its twenty-third session (COP 23), held in Bonn from 6 to 18 November 2017.
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United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), adopted by the UN General Assembly on Thursday, 13 September 2007.

Universal Declaration of Human Rights, adopted by the United Nations General Assembly Resolution 217 A (III) on 10 December 1948.

United Nations Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted at the Third UN World Conference on Disaster Risk Reduction in Sendai, Japan, on 18 March 2015.

Non-legally-binding instruments

Agenda 21, adopted at the United Nations Conference on Environment and Development, 3–14 June 1992.

Bonn Challenge, launched in 2011 by the Government of Germany and IUCN, and later endorsed and extended by the New York Declaration on Forests at the 2014 UN Climate Summit.

CEDAW General Recommendation No. 37 on gender related dimensions of disaster risk reduction in the context of climate change, CEDAW/C/GC/37 (2018).

Code of Conduct for Responsible Fisheries, adopted by the FAO Conference, 31 October 1995.

Codex Alimentarius – Guidelines for the Production, Processing, Marketing and Labelling of Organically Produced Foods (CXG 32-1999), adopted in 1999 with revisions in 2001, 2003, 2004 and 2007 and amendments in 2008, 2009, 2010, 2012 and 2013 under the Codex Alimentarius Commission, Joint FAO/WHO Food Standards Programme, Rome.

Declaration of Legal Principles Relating to Climate Change adopted by the International Law Association. 2014.

International Code of Conduct on Pesticide Management, developed by FAO and WHO and adopted at the thirty-eighth FAO Conference, June 2013. Originally adopted in 1985 under the title International Code of Conduct on the Distribution and Use of Pesticides (revised in 1989 and 2002).

New York Declaration on Forests, launched at the UN Climate Summit 2014 in New York and endorsed by more than 190 entities.

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Oslo Principles on Global Climate Change Obligations, adopted by the Global Justice Program on 1 March 2015.

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Rio Declaration on Environment and Development, adopted at the United Nations Conference on Environment and Development, 3–14 June 1992.

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Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines) were adopted by the Committee on Fisheries of FAO in June 2014.

Voluntary Guidelines for Sustainable Soil Management were adopted by the Fourth Global Soil Partnership (GSP) Plenary Assembly (Rome, 25 May 2016) and endorsed by the 155th session of the FAO Council (Rome, 5 December 2016). (also available at <http://www.fao.org/3/a-bl813e.pdf>).

Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT), adopted at the thirty-eighth Special Session of the Committee on World Food Security (CFS) in 2012. (also available at <http://www.fao.org/docrep/016/i2801e/i2801e.pdf>).

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Central America

(Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama)

- Convention for the Conservation of the Biodiversity and the Protection of Priority Wilderness Areas in Central America, 5 June 1992.
- Convention for the management and conservation of the natural forest ecosystems and the development of forest plantations, adopted 29 October 1993 and entered into force 15 October 1999.

European Union

- Common agricultural policy (CAP), launched in 1969, with 4 regulations in 2013 that set out the different elements of the CAP work under Regulations 1305–1308.
- Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources.
- Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive).
- Decision 406/2009/EC on the Effort of Member States to Reduce Their GHG Emissions to Meet the Community's GHG Emission

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- Regulation (EC) No. 1 224/2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy (EU Control Regulation), 20 November 2009.
- Regulation (EU) No. 995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market (EU Timber Regulation).
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- Regulation (EU) No. 1 307/2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No. 637/2008 and Council Regulation (EC) No. 73/2009. 17 December 2013.
- Regulation No. 1 308/2013 establishing a common organisation of the markets in agricultural products and repealing Council Regulations (EEC) No. 922/72, (EEC) No. 234/79, (EC) No. 1 037/2001 and (EC) No. 1 234/2007. 17 December 2013.
- Regulation (EU) 2018/841 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No. 525/2013 and Decision No. 529/2013/EU.

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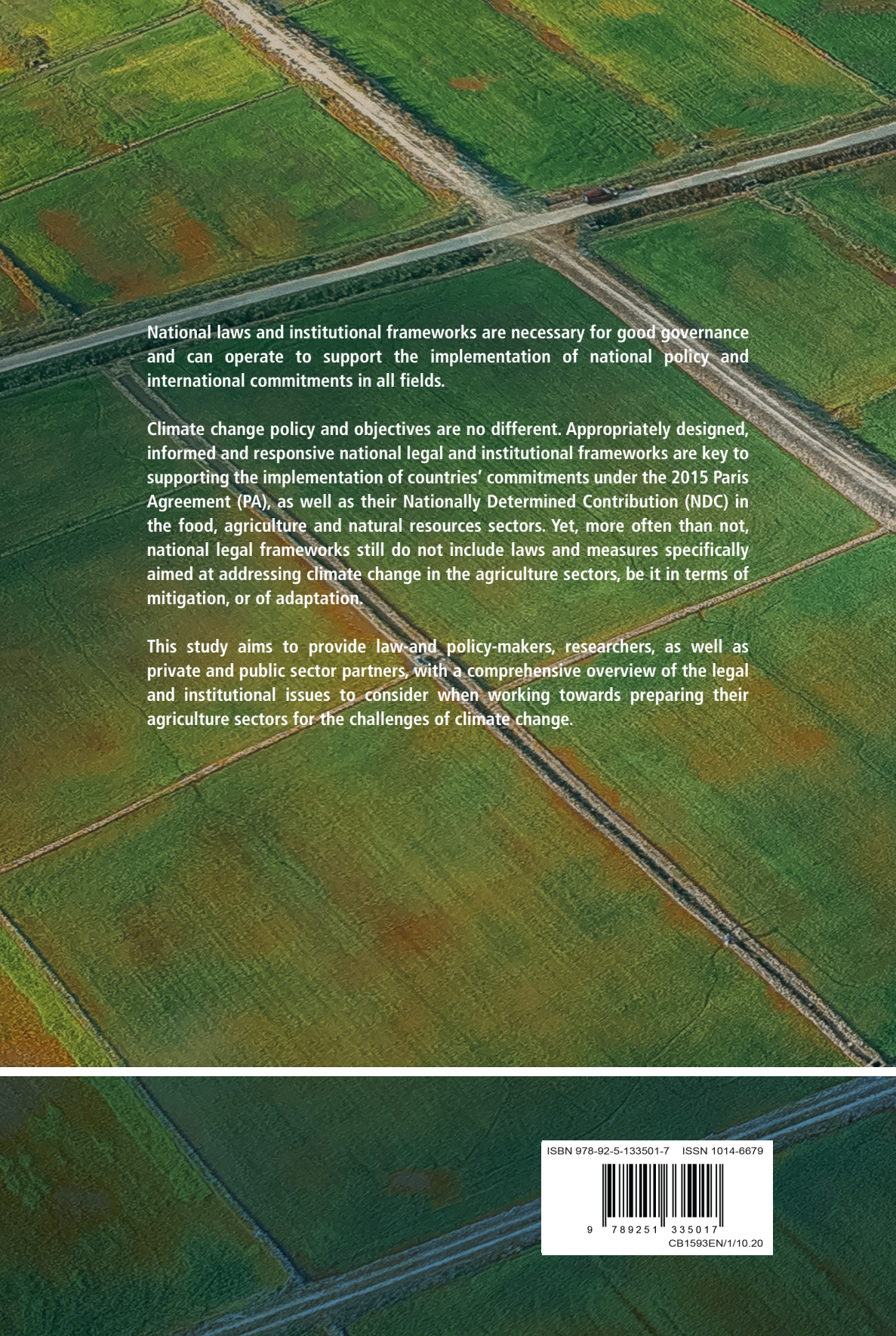
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National laws and institutional frameworks are necessary for good governance and can operate to support the implementation of national policy and international commitments in all fields.

Climate change policy and objectives are no different. Appropriately designed, informed and responsive national legal and institutional frameworks are key to supporting the implementation of countries' commitments under the 2015 Paris Agreement (PA), as well as their Nationally Determined Contribution (NDC) in the food, agriculture and natural resources sectors. Yet, more often than not, national legal frameworks still do not include laws and measures specifically aimed at addressing climate change in the agriculture sectors, be it in terms of mitigation, or of adaptation.

This study aims to provide law and policy-makers, researchers, as well as private and public sector partners, with a comprehensive overview of the legal and institutional issues to consider when working towards preparing their agriculture sectors for the challenges of climate change.

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