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# LINKING NATIONALLY DETERMINED CONTRIBUTIONS AND THE SUSTAINABLE DEVELOPMENT GOALS THROUGH AGRICULTURE

A methodological framework

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# LINKING NATIONALLY DETERMINED CONTRIBUTIONS AND THE SUSTAINABLE DEVELOPMENT GOALS THROUGH AGRICULTURE

*A methodological framework*

Krystal Crumpler, Mario Bloise, Alexandre Meybeck, Mirella Salvatore and Martial Bernoux

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# ACRONYMS AND ABBREVIATIONS

<b>AFOLU</b>	Agriculture, Forestry and Other Land Use
<b>COP</b>	Conference of the Parties
<b>CSA</b>	Climate-Smart Agriculture
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>GHG</b>	Greenhouse Gas
<b>INDC</b>	Intended Nationally Determined Contributions
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>LULUCF</b>	Land Use, Land Use Change and Forestry
<b>M&amp;E</b>	Monitoring and Evaluation
<b>MRV</b>	Measuring, Reporting and Verification
<b>NDC</b>	Nationally Determined Contributions
<b>SDG</b>	Sustainable Development Goal
<b>UN</b>	United Nations
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change



# INTRODUCTION

**The world faces a double challenge of eradicating hunger by 2030 and stabilizing the global climate at the same time.** In 2015, with the adoption of the 2030 Agenda for Sustainable Development and the Paris Agreement, developed and developing countries alike pledged to take ambitious action to end all forms of poverty, fight inequalities, and tackle climate change, ensuring that no one is left behind.

**The Paris Agreement rests upon 167 Nationally Determined Contributions (NDCs)<sup>1</sup> that reflect the national climate targets, policies and measures of 194 countries, while the Sustainable Development Goals (SDGs) are defined by 17 goals with 169 targets,<sup>2</sup> which need to be translated into national plans.**

**The SDGs and NDCs are interlinked** (GIZ and WRI, 2018). Both the 2030 Agenda and the preamble of the Paris Agreement acknowledge the intrinsic relationship between climate change, sustainable development and food security. The 2030 Agenda mainstreams climate change throughout its 17 goals and refers to the United Nations Framework Convention on Climate Change (UNFCCC) as the primary international forum for negotiating the global response to climate change. Similarly, the Paris Agreement requires parties to embed climate action “in the context of sustainable development” and acknowledges 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.”<sup>3</sup>

**The challenge is to strike a balance between emissions reductions, adaptation and development priorities, and find policies that co-deliver.** Climate change response pathways in developing countries should address the dual need for mitigation and adaptation together, leveraging synergies and reconciling tradeoffs amongst varying objectives.

**The agriculture sectors<sup>4</sup> are uniquely placed to deliver on both climate and development goals.** With more frequent and intense climate variability and extremes, agriculture and food systems<sup>5</sup> are especially vulnerable to the impacts of climate change, and agriculture livelihoods and food security and nutrition outcomes are increasingly threatened (FAO 2018a). While representing a significant contributor to global Greenhouse Gas (GHG) emissions, the agriculture and land use sectors are the only sectors able to deliver on both adaptation and mitigation together, making them a fundamental part of the solution to tackle climate change.

**Transforming the approach to NDC and SDG implementation in the agriculture sectors from silos to synergies presents an unprecedented opportunity** for national governments to leverage progress across both agendas and optimize resources in the path towards low-emissions and climate resilient development. Capturing the co-benefits of mitigation and adaptation in the agriculture sectors can also support progress in achieving the objectives of other international agreements, including the Sendai Framework for Disaster Risk Reduction, the United Nations Convention to Combat Desertification and the Convention on Biological Diversity.

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<sup>1</sup> For the purpose of this document, Intended Nationally Determined Contributions (INDCs) and Nationally Determined Contributions (NDCs) are referred to collectively as NDCs.

<sup>2</sup> As of April 1, 2019.

<sup>3</sup> Article 2.1 of Paris Agreement.

<sup>4</sup> For the purposes of this document, the agriculture sectors comprise crops, livestock, fisheries and aquaculture, and forestry.

<sup>5</sup> For the purposes of this document, agriculture and food systems refer to all stages along the food value chain from production to consumption.



# OBJECTIVE

**To understand the degree of alignment between NDCs in the agriculture sectors and the 17 goals and 169 targets of the 2030 Agenda for Sustainable Development**, this paper presents a methodology for mapping climate change mitigation and adaptation measures (collectively referred to as “climate actions”) in the agriculture sectors set forth in the NDCs to the SDG targets. It identifies potential “climate action-sustainable development pathways” spanning 17 major agricultural climate action categories and the 17 SDG targets. The aim of this mapping exercise is to explore the extent to which the two agendas are aligned for the prioritization of those climate actions that have the potential to co-deliver on the Paris Agreement and 2030 Agenda.

**This publication takes the NDCs in agriculture as its starting point** and assesses the inter-connected and multi-faceted impact pathways between sectoral adaptation and mitigation measures and achieving the SDGs. It attempts to add value to the existing body of literature (Dzebo A. *et al.* 2017, FAO 2018b, Northrop E. *et al.*, 2016 and GIZ-WRI, 2018) around the linkages between NDCs and SDGs by providing an agriculture-specific lens to the analysis. To do this, a methodology is proposed for transforming the NDCs, which are heterogeneous in structure, scope and level of detail, into a set of raw data by means of a common framework and approach for assessing the NDCs (FAO, 2019a). This standardized classification system enables the linking process by which NDCs are connected to SDG targets.

At the national level, the analysis can facilitate cost-effective decision-making and integrated implementation where appropriate. At the regional and global level, the analysis can guide international support options, optimize limited resources and support international dialogues and processes in line with the global climate and sustainable development agendas.

**The paper is organized in four parts:**

**Part 1** describes the data sources and database structure for analyzing the links between NDCs in the agriculture sectors and SDGs.

**Part 2** illustrates a common framework for transforming the NDCs in the agriculture sectors into a set of raw data points for analysis.

**Part 3** presents a methodological matrix for linking the climate actions in the NDCs to the 17 SDGs and 169 targets and presents the potential “climate action-sustainable development pathways” generated in the agriculture sectors.

**Part 4** discusses the unique opportunity that “climate action-sustainable development pathways” present for national governments to co-deliver on the Paris Agreement and 2030 Agenda for Sustainable Development.

# PART 1



## DATA

A stocktaking of all NDCs to date served to identify a common set of categories and sub-categories for quantifying and qualifying the types of climate change mitigation and adaptation contributions in the agriculture sectors. The common framework created allows for the transformation of the NDCs into a set of raw data points that can then be linked to the 17 SDGs and 169 SDG targets.

## 1.1 DATA SOURCE

**The NDC-SDG link methodology is based on a review of the each of the agricultural components of 167 (I)NDCs, representing 194 countries,<sup>6</sup> submitted to date.<sup>7</sup>** Each of the (I)NDCs were accessed in English, or Spanish or French when the English version was not available, at UNFCCC NDC Registry,<sup>8</sup> or INDC Submissions webpage.<sup>9</sup> A stocktaking exercise was performed to quantify and qualify the types of climate actions in the agriculture sectors by means of a common set of indicators and sub-indicators. Each climate action was linked to one or more of the 169 SDG targets defined in the Resolution adopted by the General Assembly on Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development (A/RES/71/313).

<sup>6</sup> The European Union comprises 28 countries.

<sup>7</sup> As of April 1, 2019.

<sup>8</sup> Interim NDC Registry can be found at <https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>.

<sup>9</sup> INDC Submissions can be found at <https://www4.unfccc.int/sites/submissions/INDC/Submission%20Pages/submissions.aspx>.

## 1.2 DATABASE STRUCTURE

Each NDC was studied in full text to identify common structural elements in the agriculture sectors, which served as the basic parameters for categorizing the NDCs. A database was structured around agriculture-specific categories, in line with standard classifications and/or established literature when possible. In order to account for the cross-cutting nature of agriculture, climate change, and food security, and of their links with multiple sectors, the database was designed to also include elements that are not specific to agriculture but closely tied to it. Following the categorization process, the NDCs were screened again to count the number of countries referring to each category and sub-category, using binary coding. The final list of categories and sub-categories contained in the NDC climate action database is presented in Part 2 and in full detail in FAO (2019a). Based on the typology of climate actions identified, a methodological matrix was developed to identify the links between climate actions and each of the SDG targets. The screening, categorization and linking processes were undertaken by at least three independent reviewers to assure consistency and quality control.

## 1.3 LIMITATIONS

It should be noted that the methodology provides for an analysis of the potential linkages between climate actions and SDG targets and does not assess the extent to which climate actions contribute in absolute terms to achieving a particular SDG or SDG target. Rather, the effectiveness of mitigation or adaptation policies or measures will depend on the type of policy or measure and its scope, the institutional arrangements in place, the technical capacity of stakeholders, barriers to adoption and provision of support. It is also important to keep in mind that climate actions are place- and context-specific. While the different typologies of climate actions are presented as supportive of particular SDGs, this synergy may not exist in all places and contexts.

The use of a binary methodology to describe the contribution of climate actions to a particular SDG target is a first step. It does not convey the strength of the contribution, which is a limitation. In reality, climate actions will generate direct and indirect impacts on SDG outcomes, based on transmission pathways differentiated in time and space. Further analysis should be done to assess the differentiated pathways by which climate actions in the agriculture sectors contribute to and/or impede progress on SDG outcomes, validated by country case studies.

# PART 2



# CLIMATE ACTIONS IN THE NATIONALLY DETERMINED CONTRIBUTIONS

This section presents the common framework under which the climate actions in the agriculture sectors contained in the NDCs can be transformed into raw data points according to a set of parameters and sub-categories. Each typology of climate action can then be linked, if appropriate, to one or more of the SDG targets. For the purpose of this document, as do most countries' NDCs, the agriculture sectors, or the Agriculture, Forestry and Other Land Use (AFOLU) sector in the Intergovernmental Panel on Climate Change (IPCC) terminology, is distinguished by the agriculture and Land Use, Land Use Change and Forestry (LULUCF) sectors.

## 2.1 MITIGATION

**Each mitigation policy or measure, or climate action, in the agriculture and/or LULUCF sectors referenced in the NDC can be qualified by the following characteristics** using the parameters outlined in **Table 1**:

- ▶ Type of land use category or agriculture sub-sector;
- ▶ Type of land use or agriculture management activity;
- ▶ Type of bioenergy production and use (if applicable); and
- ▶ Type of food loss and waste reduction (if applicable).

Each policy or measure may be associated with one of six land use categories, as defined by the IPCC (2014a), or one of two agriculture sub-sectors (FAO, n.d.). Each policy or measure can be associated with one of 34 types of land use or agriculture management activities.<sup>10</sup> If applicable, each policy or measure may be associated with one of six types of bioenergy (IPCC, 2014a). If applicable, each policy or measure can be associated with one of four types of food loss and waste reduction measures (HLPE, 2014), where food losses occur during production, post-harvest and processing operations, and food waste occurs at marketing and consumer levels. **Table 1** lists the categories and parameters used to qualify sectoral mitigation policies and measures in the agriculture and LULUCF sectors found in the NDCs.

<sup>10</sup> Elaboration of supply-side mitigation options in IPCC (2014a).



TABLE 1.

## QUALIFICATION OF MITIGATION POLICIES AND MEASURES IN THE AGRICULTURE AND LULUCF SECTOR

CATEGORY AND PARAMETERS	SOURCE
<b>STAGE OF FOOD VALUE CHAIN</b> PRODUCTION AGGREGATION PROCESSING DISTRIBUTION CONSUMPTION FULL VALUE CHAIN	FAO (2014A)
<b>TYPE OF INTERVENTION</b> BIOPHYSICAL ECONOMIC REGULATORY AND CONTROL INSTITUTIONAL INFORMATIONAL	IPCC (2014a)
<b>TYPE OF LAND USE CATEGORIES AND AGRICULTURE SUB-SECTORS</b> ALL LAND AGRICULTURAL LAND CROPLAND GRASSLAND FOREST LAND WETLANDS AND ORGANIC SOILS LIVESTOCK INTEGRATED SYSTEMS BIOENERGY FROM AGRICULTURE BIOENERGY FROM FORESTS	IPCC (2014A) AND FAO (n.d.)
<b>TYPE OF LAND USE AND AGRICULTURE MANAGEMENT ACTIVITY</b> <b>CROPLAND, GRASSLAND AND AGRICULTURAL LAND</b> GENERAL CROPLAND MANAGEMENT GENERAL GRASSLAND MANAGEMENT PLANT MANAGEMENT RICE MANAGEMENT NUTRIENT MANAGEMENT TILLAGE/RESIDUE MANAGEMENT FIRE MANAGEMENT SET ASIDE IRRIGATION AND DRAINAGE SUSTAINABLE WATER USE AND MANAGEMENT ANIMAL MANAGEMENT GENERAL AGRICULTURE MANAGEMENT SUSTAINABLE AGRICULTURE PRACTICE/APPROACH <b>FOREST LAND</b> GENERAL FOREST LAND MANAGEMENT REDUCING DEFORESTATION AND FOREST CONSERVATION REDUCING DEGRADATION AND SUSTAINABLE FOREST MANAGEMENT FIRE MANAGEMENT AFFORESTATION/REFORESTATION <b>WETLANDS AND ORGANIC SOILS</b> WETLANDS MANAGEMENT AQUACULTURE MANAGEMENT REWET ORGANIC SOILS DRAINED FOR AGRICULTURE <b>LIVESTOCK</b> GENERAL LIVESTOCK MANAGEMENT FEEDING BREEDING AND HUSBANDRY MANURE MANAGEMENT <b>INTEGRATED SYSTEMS</b> AGROFORESTRY OTHER MIXED PRODUCTION SYSTEMS <b>ALL LAND</b> GENERAL LAND USE MANAGEMENT <b>BIOENERGY</b> GENERAL BIOENERGY PRODUCTION LIQUID BIOFUEL PRODUCTION SOLID BIOFUEL PRODUCTION USE OF ENERGY-EFFICIENT FUELWOOD COOKSTOVES <b>OTHER</b> FISHERIES MANAGEMENT BLUE CARBON OTHER	IPCC (2014A) AND FAO CONSULTATION

<b>TYPE OF BIOENERGY PRODUCTION AND USE</b> LIQUID BIOFUEL PRODUCTION • BIOGAS PRODUCTION SOLID BIOFUEL PRODUCTION • WOODFUEL AND CHARCOAL PRODUCTION USE OF ENERGY-EFFICIENT COOKSTOVES NON SPECIFIED BIOMASS FEEDSTOCK PRODUCTION	IPCC (2014a)
<b>TYPE OF FOOD LOSS AND WASTE REDUCTION</b> PREVENTION REUSE RECYCLE RECOVERY	HLPE (2014)

## 2.2 ADAPTATION

The climate actions in the agriculture sectors presented under the adaptation component of NDCs can be qualified by the following characteristics:

- ▶ Type of adaptation priority sectors;
- ▶ Type of adaptation cross-sectoral priorities;
- ▶ Type of adaptation measure, by system, land use/sub-sector or social dimension;
- ▶ Type of bioenergy production and use (if applicable); and
- ▶ Type of food loss and waste reduction (if applicable).

Adaptation priority sector(s) can be characterized by one or more of six agriculture sub-sectors (FAO, n.d.). Adaptation cross-sectoral adaptation priorities can be associated with one or more of 14 cross-sectoral priorities in either ecosystems or social systems (FAO, n.d.). **Table 2** lists the categories and parameters used to describe adaptation priority sectors and cross-sectoral priorities for adaptation in agriculture.

**TABLE 2.**

### QUALIFICATION OF ADAPTATION PRIORITY SECTORS AND CROSS-SECTORAL PRIORITIES FOR ADAPTATION IN AGRICULTURE

CATEGORY AND PARAMETERS	SOURCE
<b>TYPE OF PRIORITY SECTOR(S)</b> ALL SUB-SECTORS CROPS LIVESTOCK FISHERIES AND AQUACULTURE BIOENERGY INTEGRATED SYSTEMS FORESTRY	FAO (n.d.)
<b>TYPE OF CROSS-SECTORAL PRIORITIES</b> <b>ECOSYSTEMS</b> ECOSYSTEMS AND NATURAL RESOURCES WATER LAND AND SOIL OCEANS AND COASTAL ZONES BIODIVERSITY AGRI-FOOD CHAIN <b>SOCIAL SYSTEMS</b> FOOD SECURITY AND NUTRITION DISASTER RISK REDUCTION AND MANAGEMENT HEALTH RESILIENT INFRASTRUCTURE GENDER LOCAL COMMUNITIES AND INDIGENOUS PEOPLES POVERTY AND INEQUALITY REDUCTION HUMAN RIGHTS	FAO (n.d.)

Each adaptation measure in ecosystems can be characterized by one of seven ecosystem categories, as defined by the Economics of Ecosystems and Biodiversity (TEEB, 2010) and Millennium Ecosystem Assessment (MEA, 2005). If the adaptation measure is associated with agro-ecosystems, the measure can be further differentiated by one of six land use categories, as defined by IPCC (2014a) and one of six agriculture sub-sectors (FAO, n.d.). Each adaptation measure in ecosystems can be characterized by one of 63 ecosystem and natural resource management options.<sup>11</sup> If applicable, each policy or measure may be associated with one of five types of bioenergy-related adaptation measures.<sup>12</sup> If applicable, each policy or measure can be characterized by one of five stages in the food value chain defined by FAO (2014a), where production includes pre-harvest/slaughter and harvest/slaughter. If applicable, each policy or measure is associated with one of four types of food loss and waste reduction measures.<sup>13</sup> **Table 3** lists the categories and parameters used to qualify adaptation measures in ecosystems found in the NDCs.

**TABLE 3.****QUALIFICATION OF THE ADAPTATION MEASURES IN THE AGRICULTURE SECTORS**

CATEGORY AND PARAMETERS	SOURCE
<b>TYPE OF INTERVENTION</b> BIOPHYSICAL ECONOMIC REGULATORY AND CONTROL INSTITUTIONAL INFORMATIONAL	IPCC (2014a)
<b>TYPE OF ECOSYSTEM</b> ALL ECOSYSTEMS AGRO-ECOSYSTEM DESERT MOUNTAIN INLAND WATER WETLANDS POLAR ICE OCEAN AND COASTAL ZONE	TEEB (2010) AND MEA (2005)
<b>TYPE OF AGRO-ECOSYSTEM</b> ALL SUB-SECTORS CROPS LIVESTOCK INTEGRATED SYSTEMS FORESTRY AQUACULTURE FISHERIES	IPCC (2014a) AND FAO (n.d.)
<b>TYPE OF LAND USE CATEGORY</b> ALL LAND AGRICULTURAL LAND CROPLAND GRASSLAND FOREST LAND WETLANDS	IPCC (2014a)
<b>TYPE OF ECOSYSTEM AND NATURAL RESOURCE MANAGEMENT OPTION</b> <b>CROPS</b> GENERAL CROP MANAGEMENT PEST AND DISEASE MANAGEMENT PLANT MANAGEMENT NUTRIENT AND ON-FARM SOIL MANAGEMENT <b>LIVESTOCK</b> GENERAL LIVESTOCK MANAGEMENT FEEDING PRACTICES ANIMAL BREEDING AND HUSBANDRY ANIMAL AND HERD MANAGEMENT MANURE MANAGEMENT	FAO (2013) AND IPCC (2014b)

<sup>11</sup> Elaboration of FAO (2013) and IPCC (2014b).

<sup>12</sup> Elaboration of IPCC (2014a).

<sup>13</sup> Elaboration of HLPE (2014).

<b>INTEGRATED SYSTEMS</b> AGROFORESTRY OTHER MIXED PRODUCTION SYSTEMS <b>FORESTRY AND LAND/SOIL RESOURCES</b> REDUCING DEFORESTATION AND FOREST CONSERVATION REDUCING DEGRADATION AND SUSTAINABLE FOREST MANAGEMENT AFFORESTATION/REFORESTATION PROMOTION OF URBAN AND PERI-URBAN FORESTRY WETLANDS MANAGEMENT REWET PEATLANDS DRAINED FOR AGRICULTURE LAND/SOIL CONSERVATION, RESTORATION AND REHABILITATION INTEGRATED LANDSCAPE MANAGEMENT COASTAL ZONE MANAGEMENT CROPLAND MANAGEMENT GRASSLAND MANAGEMENT FIRE MANAGEMENT ON CROPLAND FIRE MANAGEMENT ON GRASSLAND FIRE MANAGEMENT ON FOREST LAND <b>FISHERIES AND AQUACULTURE</b> FISHERIES MANAGEMENT AQUACULTURE MANAGEMENT FISHERIES AND AQUACULTURE MANAGEMENT <b>WATER RESOURCES</b> WATER AVAILABILITY AND ACCESS WATER STORAGE AND HARVESTING IRRIGATION AND DRAINAGE SUSTAINABLE WATER USE AND MANAGEMENT WATER QUALITY AND POLLUTION MANAGEMENT DESALINISATION WATER-USE EFFICIENCY AND REUSE WATER-RELATED ECOSYSTEM PROTECTION AND RESTORATION INTEGRATED WATERSHED MANAGEMENT FLOOD MANAGEMENT <b>ECOSYSTEMS AND GENETIC RESOURCES</b> MANGROVE CONSERVATION AND REPLANTING BIODIVERSITY PROTECTION, CONSERVATION AND RESTORATION PEST AND DISEASE MANAGEMENT ECOSYSTEM MANAGEMENT, CONSERVATION AND RESTORATION PAYMENT FOR ECOSYSTEM SERVICES <b>ENERGY RESOURCES</b> BIOENERGY PRODUCTION BIOENERGY USE ENERGY USE IN AGRICULTURE <b>AGRI-FOOD CHAIN</b> INPUT PROVISION FOOD LOSS REDUCTION FOOD WASTE REDUCTION VALUE ADDITION CERTIFICATION SCHEMES SHIFT OF CONSUMPTION PATTERNS MARKET ACCESS <b>GENERAL AGRICULTURE AND LAND USE</b> SUSTAINABLE AGRICULTURE PRACTICES/APPROACH DIVERSIFICATION INTENSIFICATION CLIMATE-SMART AGRICULTURE (CSA) CONSERVATION AGRICULTURE AGROECOLOGY ECOSYSTEM-BASED ADAPTATION COMMUNITY-BASED ADAPTATION	FAO (2013) AND IPCC (2014b)
<b>TYPE OF BIOENERGY PRODUCTION AND USE MEASURE</b> LIQUID BIOFUEL PRODUCTION BIOGAS PRODUCTION SOLID BIOFUEL PRODUCTION WOODFUEL AND CHARCOAL PRODUCTION USE OF ENERGY-EFFICIENT FUELWOOD COOKSTOVES	IPCC (2014a)
<b>STAGE OF FOOD VALUE CHAIN</b> PRODUCTION AGGREGATION PROCESSING DISTRIBUTION CONSUMPTION FULL VALUE CHAIN	FAO (2014a)
<b>TYPE OF FOOD LOSS AND WASTE REDUCTION MEASURE</b> PREVENTION REUSE RECYCLE RECOVERY	HLPE (2014)

Each adaptation measure in social systems can be associated with one of three social dimensions.<sup>14</sup> Each adaptation measures can be characterized by one of 36 management options across the three dimensions.<sup>15</sup> **Table 4** lists the categories and parameters used to qualify adaptation measures in social systems found in the NDCs.

**TABLE 4.****QUALIFICATION OF THE ADAPTATION MEASURES IN SOCIAL SYSTEMS**

CATEGORY AND PARAMETERS	SOURCE
<b>TYPE OF INTERVENTION</b> BIOPHYSICAL ECONOMIC REGULATORY AND CONTROL INSTITUTIONAL INFORMATIONAL	IPCC (2014a)
<b>TYPE OF SOCIAL DIMENSION</b> SOCIO-ECONOMICS AND WELL-BEING KNOWLEDGE AND CAPACITY INSTITUTIONS AND GOVERNANCE	IPCC (2014a)
<b>TYPE OF MANAGEMENT OPTION</b> <b>SOCIO-ECONOMICS AND WELL-BEING</b> HEALTH INFORMATION AND SERVICES DISEASE MANAGEMENT AND PREVENTION FOOD SECURITY AND NUTRITION INDIGENOUS PEOPLES GENDER EQUALITY AND WOMEN EMPOWERMENT DISPLACEMENT AND MIGRATION OF VULNERABLE PEOPLE RESILIENCE AND ADAPTIVE CAPACITY BUILDING RESILIENT INFRASTRUCTURE PRODUCTIVE ASSETS DECENT RURAL EMPLOYMENT ON AND OFF-FARM LIVELIHOOD DIVERSIFICATION FARMER COOPERATIVES AND MARKET ACCESS CREDIT AND INSURANCE SERVICES SOCIAL PROTECTION POVERTY REDUCTION <b>KNOWLEDGE AND CAPACITY</b> TRADITIONAL KNOWLEDGE RESEARCH & DEVELOPMENT EXTENSION SERVICES FOR CLIMATE ACTION AWARENESS RAISING AND EDUCATION HAZARD AND VULNERABILITY MAPPING IMPACT ASSESSMENT AND MONITORING CLIMATE INFORMATION SERVICES CLIMATE INFORMATION SERVICES IN AGRICULTURE EARLY WARNING SYSTEMS EARLY WARNING SYSTEMS IN AGRICULTURE <b>INSTITUTIONS AND GOVERNANCE</b> DISASTER RISK REDUCTION AND MANAGEMENT INSTITUTIONAL CAPACITY BUILDING FOR CLIMATE ACTION LAW AND REGULATION LAND TENURE REFORM WATER GOVERNANCE PRICING MECHANISMS INVESTMENT IN AGRICULTURE TRANSPARENCY & ACCOUNTABILITY POLICY MAINSTREAMING AND COHERENCE PARTICIPATORY GOVERNANCE CONFLICT RESOLUTION	IPCC (2014b) AND FAO (2013)

**Overall, 390 potential climate actions (data points) were derived.** Using binary coding (0/1), the climate actions presented in a country's NDC should be associated with one of the climate action categories identified based on this common framework.

<sup>14</sup> Elaboration of IPCC (2014a).

<sup>15</sup> Elaboration of FAO (2013) and IPCC (2014b).

# PART 3



# LINKING CLIMATE ACTIONS TO SUSTAINABLE DEVELOPMENT GOAL

## 3.1 NDC-SDG MATRIX

A NDC-SDG matrix was developed to map the alignment between each climate action in the agriculture sectors with one or more SDG targets. A climate action may contribute to one or more SDG targets. Binary coding (0/1) was employed to quantify the alignment between the climate action and SDG target. The degree of alignment refers to the frequency of climate actions per SDG target (and does not reflect how much NDCs contribute in absolute terms to achieving a particular SDG or SDG target). In general, it is assumed that climate mitigation and adaptation actions in the agriculture sectors imply a transition from a less to more sustainable scenario in terms of economic, social, environmental and governance dimensions. It should be noted that the definition of agriculture under FAO terminology and the 2030 Agenda differs. Within the 2030 Agenda, “productive and sustainable agriculture” (target 2.4) refers to crops and livestock (FAO, 2017), while sustainable fisheries and aquaculture (target 14.7) and sustainable forestry (target 15.2) are associated with different SDGs. The definition of sustainable agriculture in the context of SDGs encompasses only a portion of FAO's vision for sustainable food and agriculture based on five principles applicable across five sectors: crops, livestock, forestry, aquaculture and fisheries (FAO, 2014b). **Annex 1**<sup>16</sup> contains the methodological matrix.

Around 1,700 potential climate action-sustainable development pathways were generated in the agriculture sector.

<sup>16</sup> **Annex 1** is located at [http://www.fao.org/3/CA5003EN/CA5003EN\\_Annex.xlsx](http://www.fao.org/3/CA5003EN/CA5003EN_Annex.xlsx)



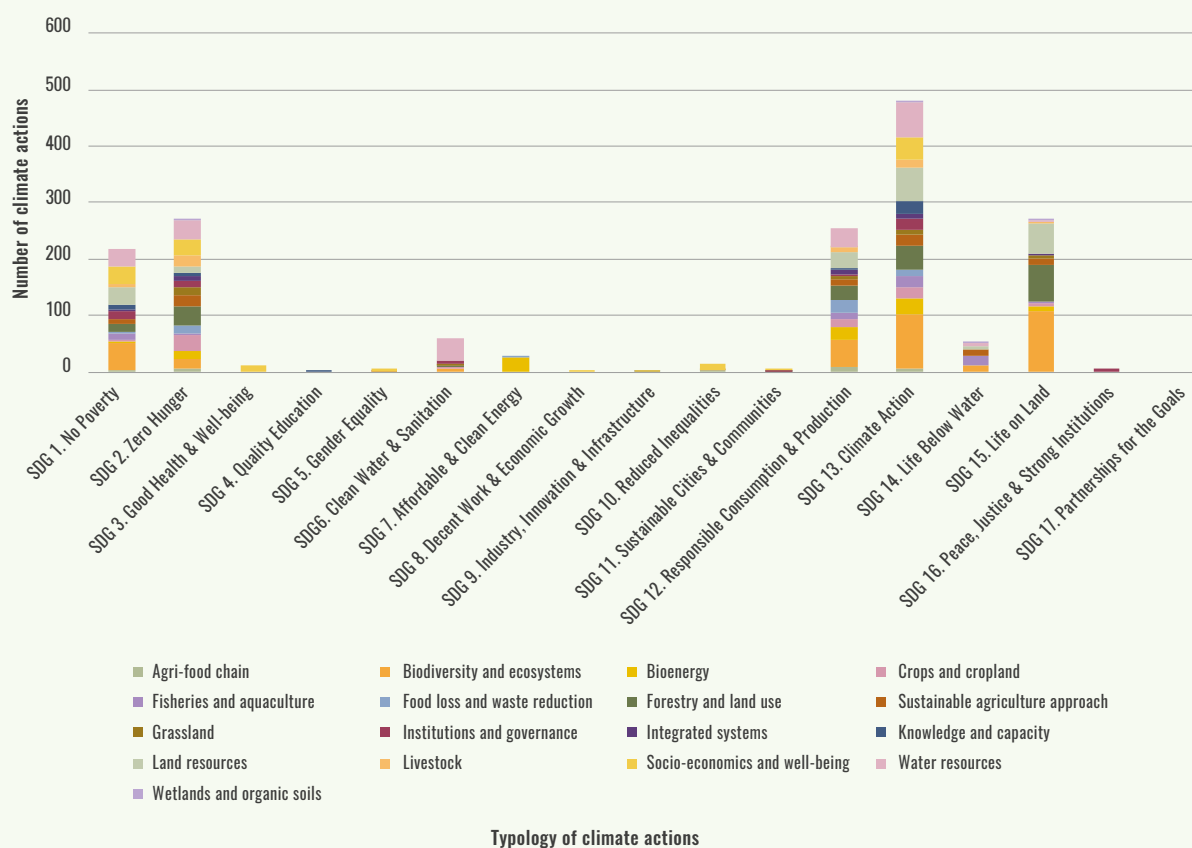
## 3.2 CLIMATE ACTION-SUSTAINABLE DEVELOPMENT PATHWAYS

This section describes the distribution of the 1,700 potential climate action-sustainable development pathways in the agriculture sectors across 17 major climate action categories<sup>16</sup> and 17 SDGs.

Overall, the greatest areas of potential convergence between the NDCs in the agriculture sectors and SDGs are found around, after SDG 13 Climate Action, SDG 15 Life on Land, SDG 2 Zero Hunger, SDG 12 Responsible consumption and production, and SDG 1 No Poverty, followed by SDG 6 Clean Water and Sanitation, SDG 14 Life below Water, and SDG 7 Affordable and Clean Energy and SDG 10 Reduced Inequalities (Figure 1-2).

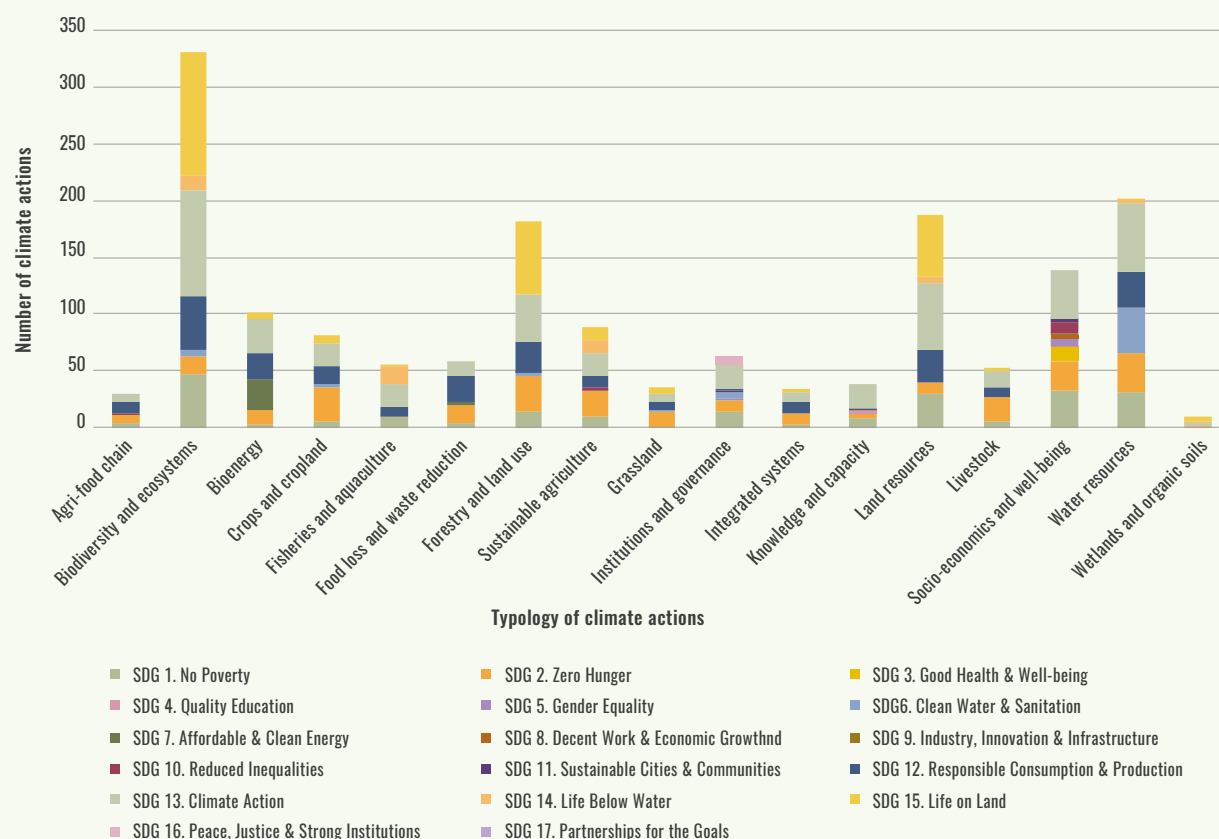
**FIGURE 1.**

**DISTRIBUTION OF CLIMATE ACTION-SUSTAINABLE DEVELOPMENT PATHWAYS IN THE AGRICULTURE SECTORS, PER SDG**



The majority of potential climate action-sustainable development pathways are found in climate actions targeting biodiversity and ecosystems, followed by water resources, land resources, forestry and land use, socio-economics and wellbeing and bioenergy.

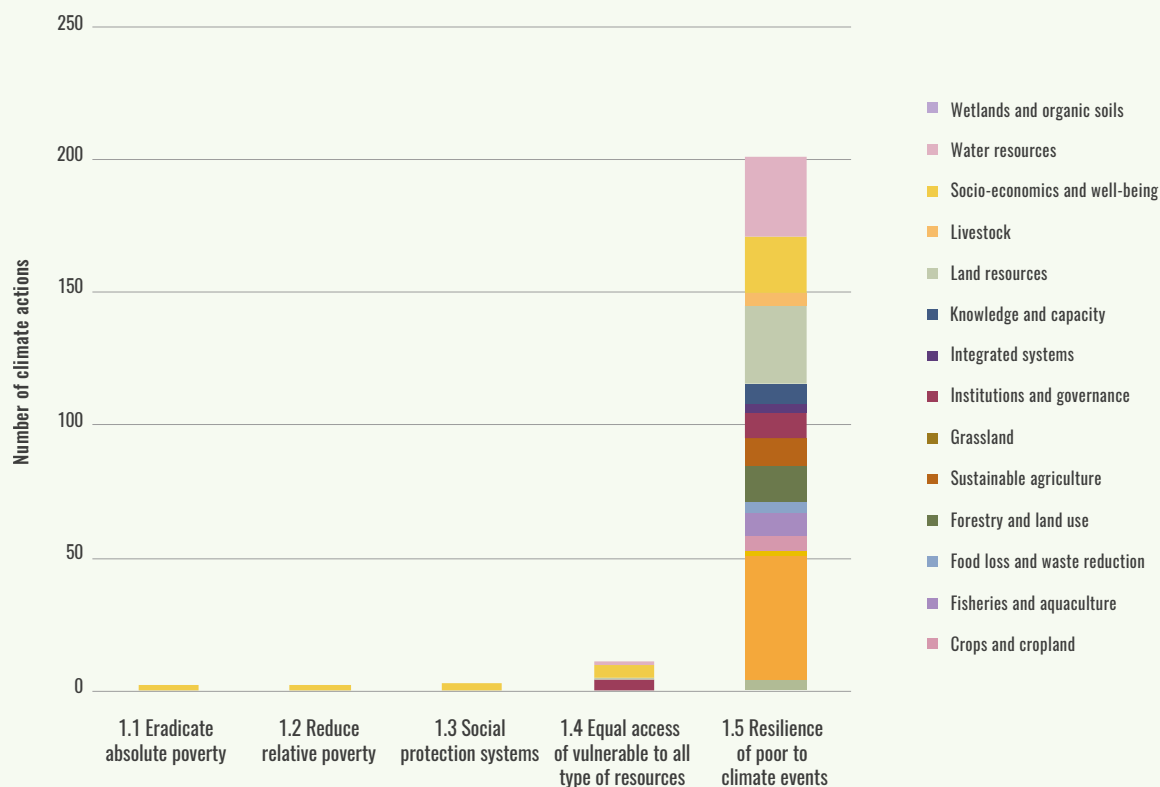
<sup>16</sup> An aggregation of the 390 climate actions derived by major agriculture and land use management category.

**FIGURE 2.****DISTRIBUTION OF CLIMATE ACTION-SUSTAINABLE DEVELOPMENT PATHWAYS, PER MAJOR CLIMATE ACTION CATEGORY**

The distribution of potential climate action-sustainable development pathways in the agriculture sectors can be disaggregated at the target level, as presented for each SDG as follows.

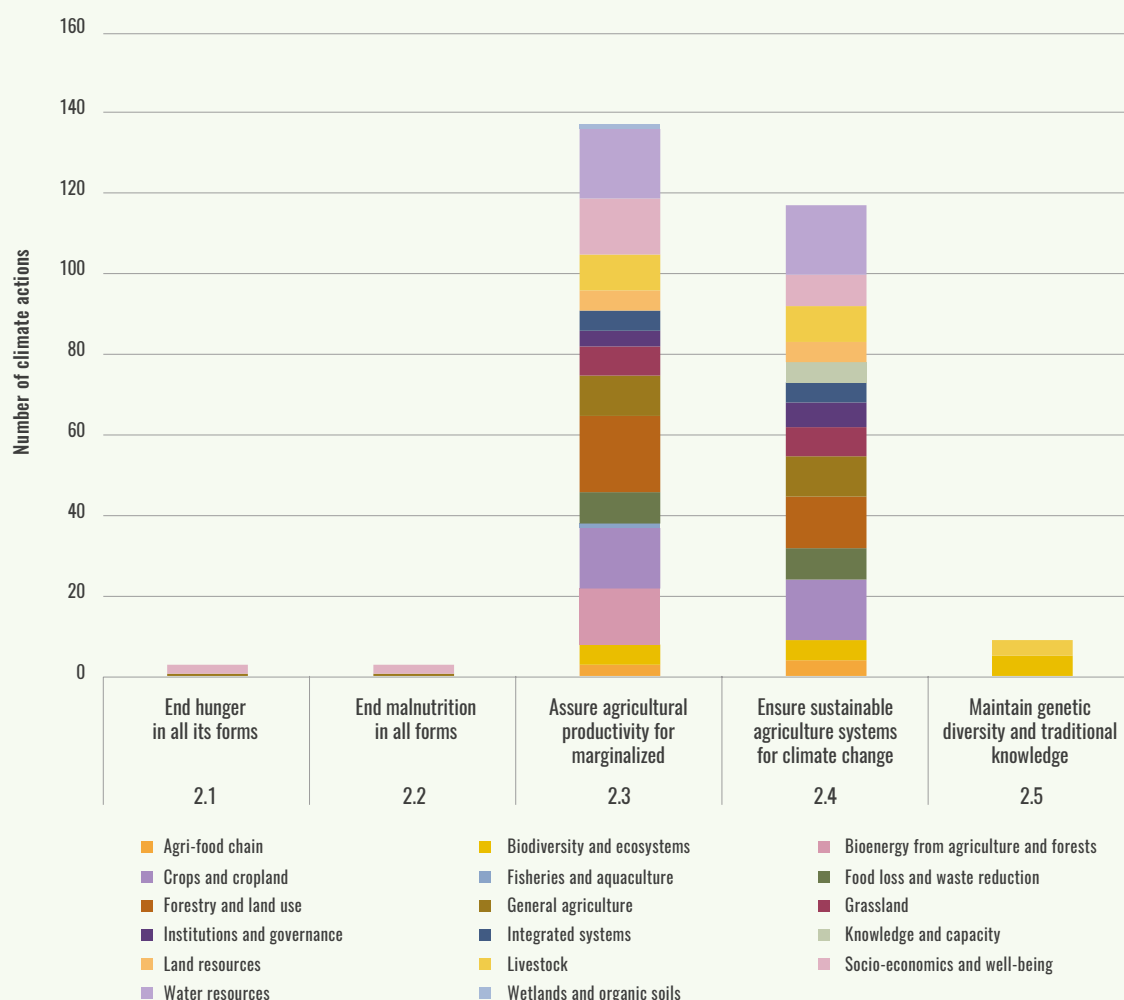
## SDG 1 No Poverty

Amongst climate action-sustainable development pathways found around SDG 1 No Poverty, the majority are observed around target 1.5 “Resilience of poor to climate events” (Figure 3). The majority of potential climate action-sustainable development pathways are generated from adaptation measures promoting biodiversity and ecosystems, socio-economics and well-being, water resources and institutions and governance. Few climate actions contribute directly to eradicating absolute poverty (1.1) and reducing relative poverty (1.2) insofar as poverty reduction impacts are transmitted through building resilience of the rural poor (1.5).

**FIGURE 3.****DISTRIBUTION OF CLIMATE ACTION-SUSTAINABLE DEVELOPMENT PATHWAYS PER SDG 1 TARGET**

## SDG 2 Zero Hunger

Amongst climate action-sustainable development pathways found around SDG 2 Zero Hunger, the majority are observed around target 2.3 “Assure agricultural productivity for marginalized” and 2.4 “Ensure sustainable agriculture systems for climate change” (Figure 4). The majority of potential climate action-sustainable development pathways are generated from climate actions promoting water resources, forestry and land use and crops and cropland management. Few climate actions contribute directly to ending hunger (2.1) and malnutrition (2.2) insofar as food security and nutrition impacts are transmitted through assuring productivity for the marginalized (2.3) and sustainable production (2.4)

**FIGURE 4.****DISTRIBUTION OF CLIMATE ACTION-SUSTAINABLE DEVELOPMENT PATHWAYS PER SDG 2 TARGET**

## SDG 3 Good Health & Well-being

Amongst climate action-sustainable development pathways found around SDG 3 Good Health & Well-being, the majority are observed around target 3.3 “End epidemics and diseases” and 3.8 “Access to universal health care and vaccination.” All potential climate action-sustainable development pathways are generated from adaptation measures targeting social systems, particularly socio-economics and well-being, as indirect pathways are not assessed.

## SDG 4 Quality Education

All climate action-sustainable development pathways contributing to SDG 4 Good Health & Well-being, are observed around target 4.7 “Ensure knowledge and skills to promote sustainable development.” All potential climate action-sustainable development pathways are generated from adaptation measures targeting social systems, particularly knowledge and capacity building.

## SDG 5 Gender Equality

Amongst climate action-sustainable development pathways found around SDG 5 Gender Equality, the majority are observed around target 5.5 “Women's leadership at all levels” and 5.4 “Social protection for care and domestic work.” All potential climate action-sustainable development pathways are generated

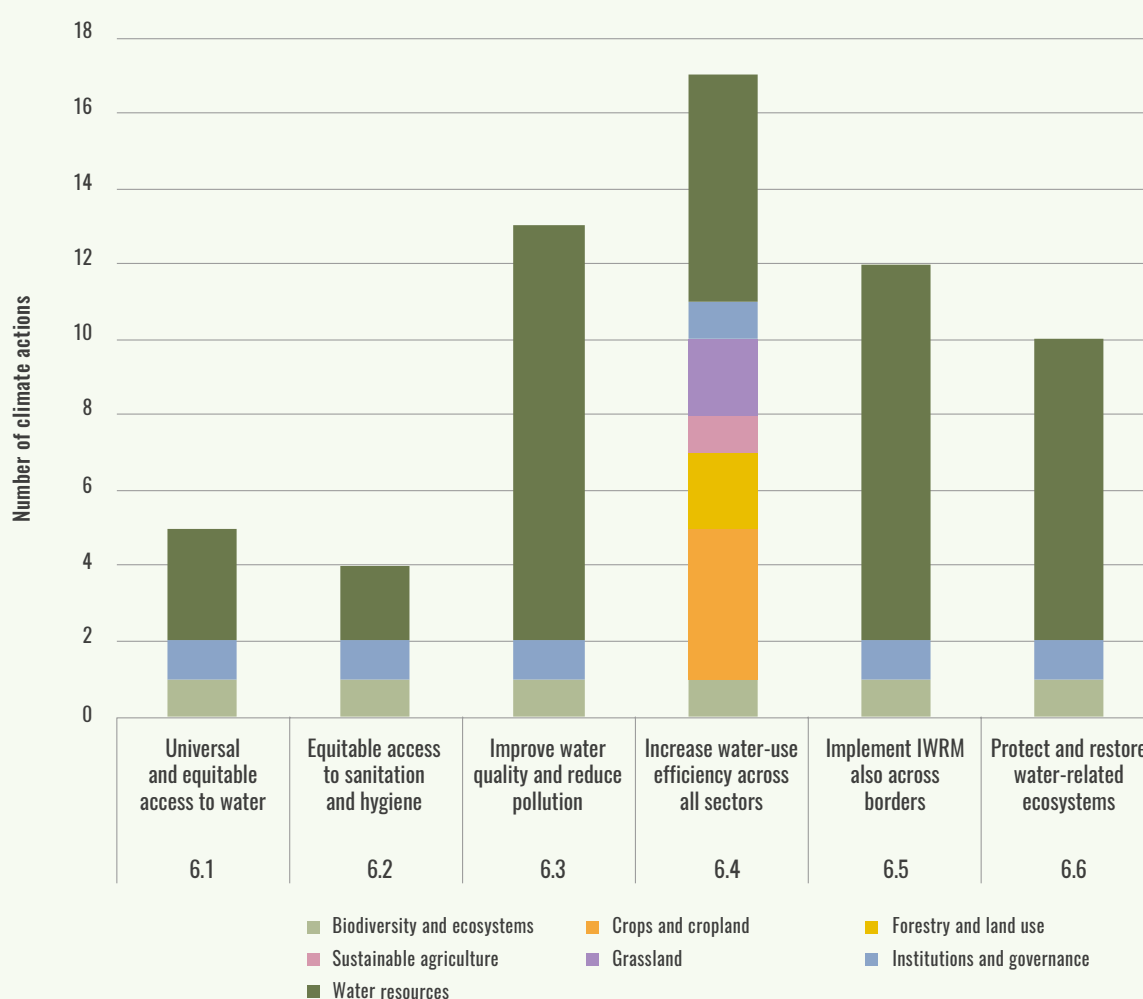
from adaptation measures targeting social systems, particularly socio-economics and well-being and institutions and governance-related measures.

## SDG 6 Clean Water & Sanitation

Amongst climate action-sustainable development pathways found around SDG 6 Clean Water & Sanitation, the majority are observed around target 6.4 “Increase water-use efficiency across all sectors” and 6.3 “Improve water quality and reduce pollution” (Figure 5). The majority of potential climate action-sustainable development pathways are generated from climate actions promoting water resources and institutions and governance.

**FIGURE 5.**

### DISTRIBUTION OF CLIMATE ACTION-SUSTAINABLE DEVELOPMENT PATHWAYS PER SDG 6 TARGET



## SDG 7 Affordable & Clean Energy

Amongst climate action-sustainable development pathways found around SDG 7 Affordable & Clean Energy, the majority are observed around target 7.2 “Increase the share of sustainable energy” and 7.3 “Double the rate of improvement in energy efficiency.” All potential climate action-sustainable development pathways are generated from climate actions promoting bioenergy from agriculture and/or forestry biomass.

## SDG 8 Decent Work & Economic Growth

All climate action-sustainable development pathways contributing to SDG 8 Decent Work & Economic Growth, are observed around target 8.5 “Employment, decent jobs and equal pay” and 8.9 “Sustainable tourism to promote local livelihoods.” All potential climate action-sustainable development pathways are generated from adaptation measures targeting social systems, particularly socio-economics and well-being, as indirect pathways are not assessed.

## SDG 9 Industry, Innovation & Infrastructure

All climate action-sustainable development pathways contributing to SDG 9 Industry, Innovation & Infrastructure, are observed around target 9.1 “Develop resilient infrastructure” and 9.5 “Strengthen R&D.” All potential climate action-sustainable development pathways are generated from adaptation measures targeting social systems, particularly socio-economics and well-being-related measures and knowledge and capacity building.

## SDG 10 Reduced Inequalities

All climate action-sustainable development pathways contributing to SDG 10 Reduced Inequalities, are observed around target 10.1 “Increase income of bottom 40% of population” and 10.2 “Promote inclusion of all.” All potential climate action-sustainable development pathways are generated from climate actions promoting sustainable agriculture, agri-food chain interventions and social systems, particularly socio-economics and well-being dimensions.

## SDG 11 Sustainable Cities & Communities

All climate action-sustainable development pathways contributing to SDG 11 Sustainable Cities & Communities, are observed around target 11.4 “Safeguard cultural and natural heritage” and 11.5 “Disaster Risk Management.” All potential climate action-sustainable development pathways are generated from adaptation measures targeting social systems, particularly socio-economics and well-being and institutions and governance-related measures.

## SDG 12 Responsible Consumption & Production

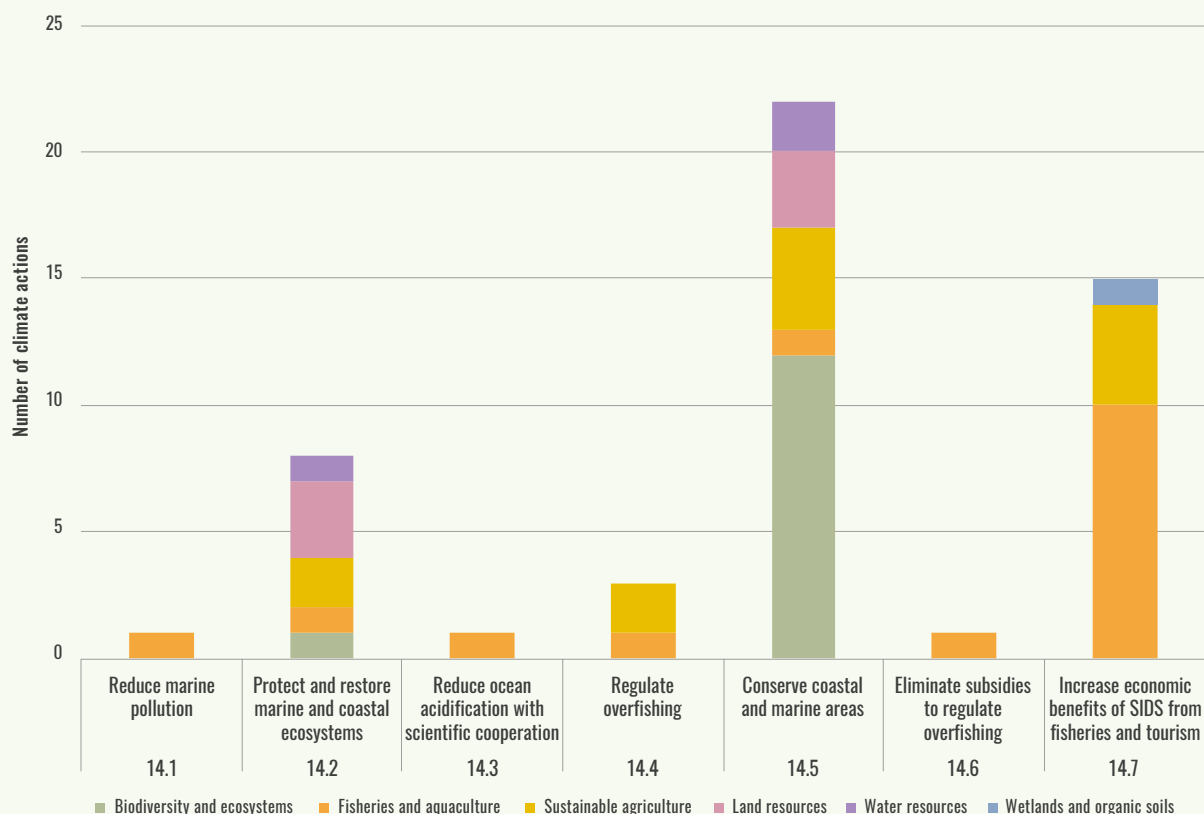
Amongst climate action-sustainable development pathways found around SDG 12 Responsible Consumption & Production, the majority are observed around target 12.2 “Efficient use of natural resources” and 12.3 “Half global food waste.” The majority of potential climate action-sustainable development pathways are generated from climate actions promoting biodiversity and ecosystems, followed by water resources, land resources, forestry and land use and food loss and waste reduction.

## SDG 13 Climate Action

All climate actions in the agriculture sectors contribute to SDG 13 Climate Action, with the majority contributing to target 13.2 “Integrate climate measures in policy making,” followed by 13.1 “Strengthen resilience and adaptive capacity” and 13.3 “Improve climate change education, awareness-raising and capacity.”

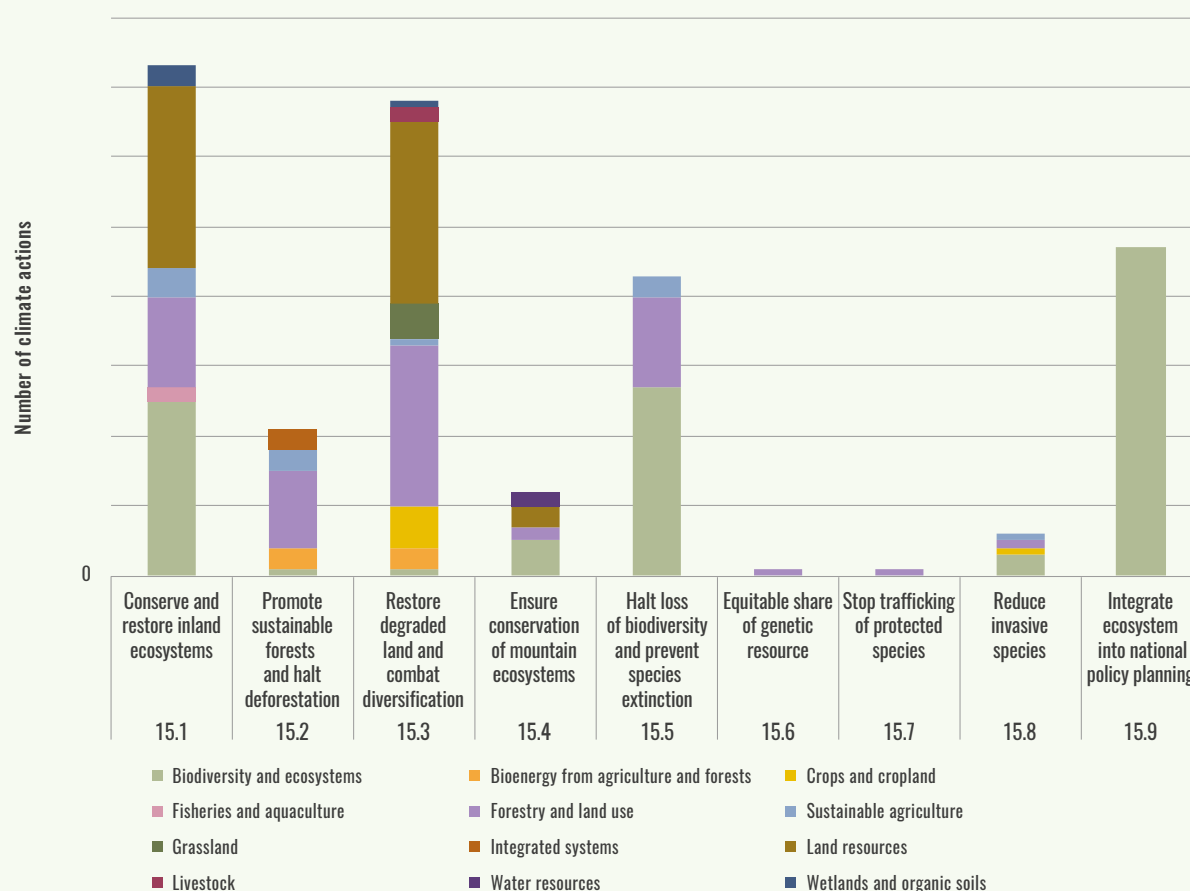
## SDG 14 Life below Water

Amongst climate action-sustainable development pathways found around SDG 14 Life below Water, the majority are observed around target 14.5 “Conserve coastal and marine areas” and 14.7 “Increase economic benefits of SIDS from fisheries and tourism” (**Figure 6**). The majority of potential climate action-sustainable development pathways are generated from climate actions promoting sustainable fisheries and aquaculture and biodiversity and ecosystems.

**FIGURE 6.****DISTRIBUTION OF CLIMATE ACTION-SUSTAINABLE DEVELOPMENT PATHWAYS PER SDG 14 TARGET**

## SDG 15 Life on Land

Amongst climate action-sustainable development pathways found around SDG 15 Life on Land, the majority are observed around target 15.1 “Conserve and restore inland ecosystems” and 15.3 “Restore degraded land and combat diversification” (**Figure 7**). The majority of potential climate action-sustainable development pathways are generated from climate actions promoting biodiversity and ecosystems and forestry and land use.

**FIGURE 7.****DISTRIBUTION OF CLIMATE ACTION-SUSTAINABLE DEVELOPMENT PATHWAYS PER SDG 15 TARGET**

## SDG 16 Peace, Justice & Strong Institutions

All climate action-sustainable development pathways contributing to SDG 16 Peace, Justice & Strong Institutions, are observed around target 16.6 “Effective, accountable and transparent institutions” and 16.7 “Responsive, inclusive and participatory decision-making.” All potential climate action-sustainable development pathways are generated from adaptation measures targeting social systems, particularly institutions and governance-related measures.

## SDG 17 Partnerships for the Goals

All climate action-sustainable development pathways contributing to SDG 17 Partnerships for the Goals, are observed around target 17.9 “Develop measurements of progress on sustainable development.” All potential climate action-sustainable development pathways are generated from climate actions promoting Monitoring and Evaluation (M&E) systems to track adaptation progress and Measuring, Reporting and Verification (MRV) systems to track mitigation actions in the agriculture sectors.





# PART 4



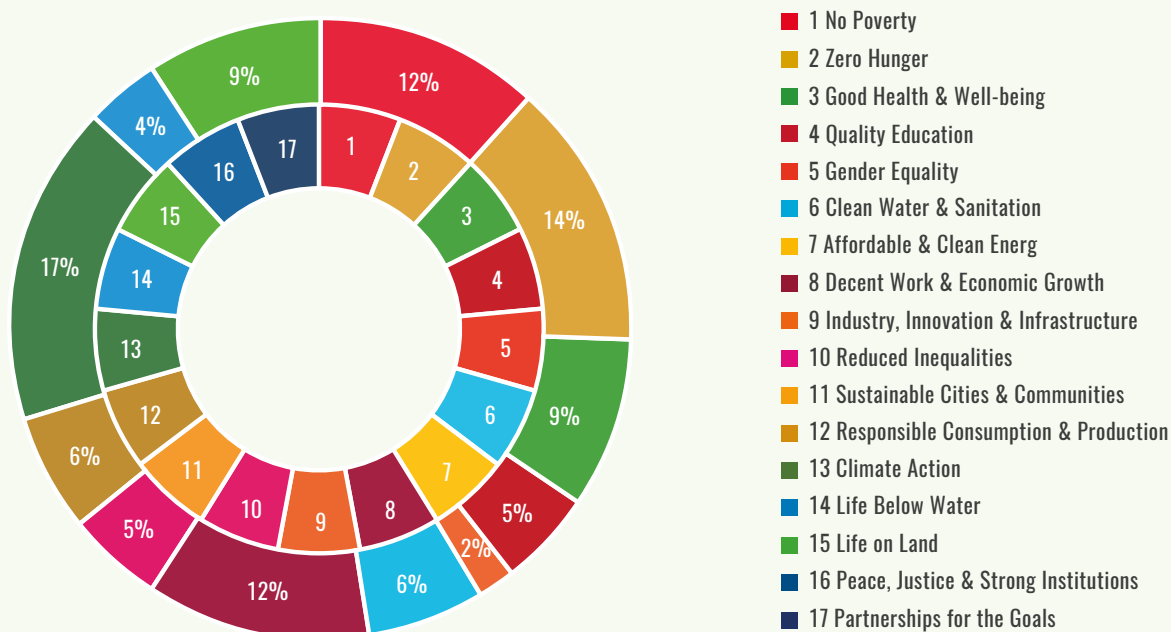
# EXAMPLE RESULTS

**Using the NDC-SDG matrix, the degree of alignment between NDC climate actions and SDG targets can be assessed at the country or regional level.** The degree of alignment refers to the frequency of SDG target links per unique climate action (and not the overall contribution of an individual action to achieving an SDG in absolute terms).

## 4.1 COUNTRY LEVEL

A country example is presented based on an aggregation of climate actions found in the NDCs of countries in the Pacific (FAO, 2019b). Overall, the greatest area of convergence between climate actions in the agriculture sectors and the SDGs in Cook Islands (**Figure 8**) were found around, in descending order:

- ▶ SDG 13 Climate action, particularly target 13.1 “Strengthen resilience and adaptive after capacity
- ▶ SDG 2 Zero Hunger, particularly target 2.3 “Assure agricultural productivity for marginalized”
- ▶ SDG 1 No Poverty, particularly target 1.5 “Resilience of poor to climate events”
- ▶ SDG 12 Responsible consumption and production, particularly target 12.2 “Efficient use of natural resources”
- ▶ SDG 3 “Good Health & Well-being”, particularly target 3.3 “End epidemics and diseases”
- ▶ SDG 15 Life on Land, target 15.3 “Restore degraded land and combat diversification”.

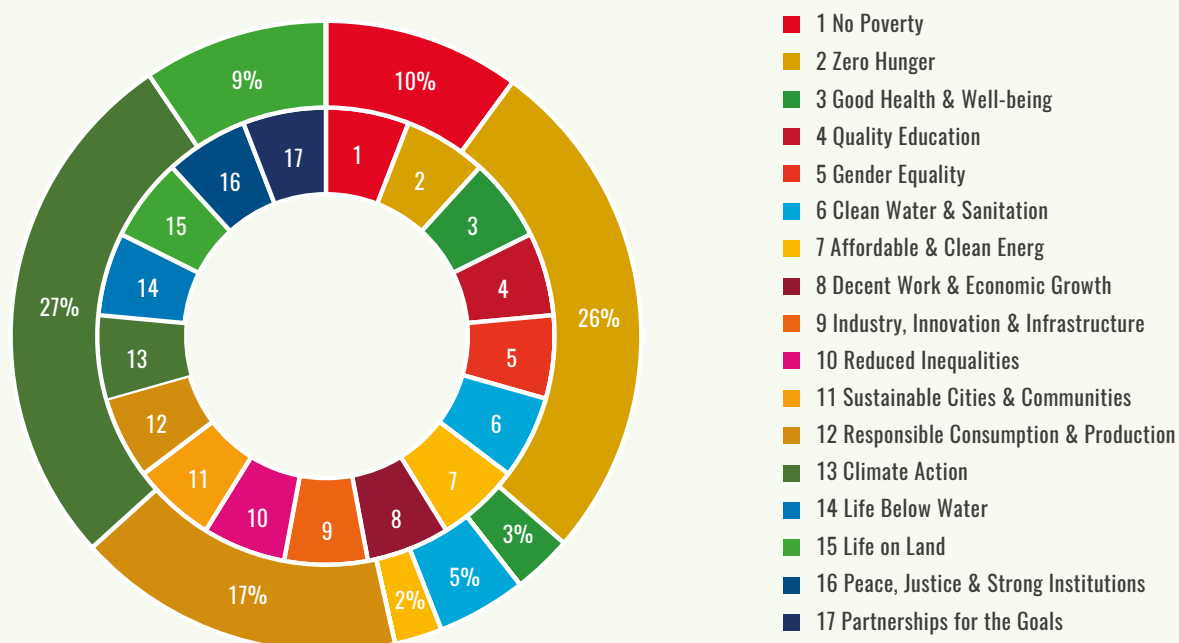
**FIGURE 8.****DEGREE OF CONVERGENCE BETWEEN CLIMATE ACTIONS IN THE AGRICULTURE SECTORS AND SDGS IN COOK ISLANDS**

Understanding policy entry-points whereby national governments can leverage synergies between climate action and sustainable development can support cost-effective decision-making and integrated implementation.

## 4.2 REGIONAL LEVEL

A regional example is presented based on an aggregation of climate actions found in the NDCs of countries in Central Asia (FAO 2019c). Overall, the greatest area of convergence between climate actions in the agriculture sectors and the SDGs in Central Asia (**Figure 9**) were found around, in descending order:

- ▶ SDG 13 Climate action, particularly target 13.2 “Integrate climate measures in policy making”
- ▶ SDG 2 Zero Hunger, particularly target 2.3 “Assure agricultural productivity for marginalized”
- ▶ SDG 15 Life on Land, target 15.1 “Conserve and restore inland ecosystems”
- ▶ SDG 1 No Poverty, particularly target 1.5 “Resilience of poor to climate events”
- ▶ SDG 12 Responsible consumption and production, particularly target 12.2 “Efficient use of natural resources”
- ▶ SDG 6 Clean water and sanitation, particularly target 6.4 “Increase water-use efficiency across all sectors”.

**FIGURE 9.****DEGREE OF CONVERGENCE BETWEEN CLIMATE ACTIONS IN THE AGRICULTURE SECTORS AND SDGS IN CENTRAL ASIA**

At the regional and global level, the analysis can guide international support options and facilitate international dialogues and processes in line with the global climate and sustainable development agendas.



# CONCLUSION

**As the window of opportunity is closing to bridge the emission gap and adapt to climate change before it is too late, the inter-linked and mutually reinforcing climate and sustainable development agendas present a natural framework for designing policies that co-deliver.** While the Paris Agreement and SDGs are generally planned and implemented in silos, their intersection in the agriculture sectors highlights an opportunity for integrated implementation. The methodological framework presented in this document attempts to facilitate the identification of policy and investment entry-points in the agriculture sectors that can accelerate progress across both agendas in tandem. The analysis aims to push national policy makers and decision makers, as well as international negotiators and global agenda setters, towards an integrated approach to climate action and sustainable development, particularly in the agriculture sectors, upon which 80 percent of the world's poor and most vulnerable depend for their livelihoods (FAO, 2018c).



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This paper presents a methodology for mapping climate change mitigation and adaptation measures (collectively referred to as “climate actions”) in the agriculture sectors set forth in the NDCs to the 17 Sustainable Development Goals (SDGs) and their 169 targets. It identifies potential “climate action–sustainable development pathways” spanning 17 major agricultural climate action categories and the 17 SDG targets. The aim of this mapping exercise is to explore the extent to which the two agendas are aligned for the prioritization of those climate actions that have the potential to co-deliver on the Paris Agreement and 2030 Agenda.

As the window of opportunity is closing to bridge the emission gap and adapt to climate change before it is too late, the inter-linked and mutually reinforcing climate and sustainable development agendas present a natural

framework for designing policies that leverage synergies between both. While the Paris Agreement and SDGs are generally planned and implemented in silos, their intersection in the agriculture sectors highlights an opportunity for integrated implementation. The methodological framework presented in this document attempts to facilitate the identification of policy and investment entry-points in the agriculture sectors that can accelerate progress across both agendas in tandem. The analysis aims to push national policy makers and decision makers, as well as international negotiators and global agenda setters, towards an integrated approach to climate action and sustainable development, particularly in the agriculture sectors, upon which 80 percent of the world’s poor and most vulnerable depend for their livelihoods (FAO, 2018c).

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