

A close-up photograph of several pairs of dark-skinned hands shelling yellow corn cobs. The hands are positioned over a large blue plastic tub that is filled with a large quantity of yellow corn kernels. The background is slightly blurred, showing more of the tub and some outdoor ground.

UNLOCKING AND SCALING CLIMATE SOLUTIONS IN FOOD SYSTEMS

An Assessment of Nationally Determined Contributions

WWF Food Practice

WWF is one of the world's largest and most experienced independent conservation organizations, with over 30 million followers and a global network active in nearly 100 countries. Alongside work in areas like wildlife, oceans and forests, the WWF Food Practice works to transform the food system to protect people and planet. Our vision is a food system which provides healthy food to all people while restoring our planet. To help achieve this goal, we work across three pillars of the food system: Sustainable Production, Healthy and Sustainable Diets and Food Loss and Waste.

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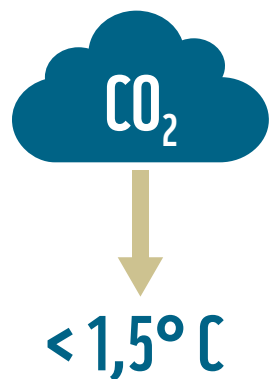
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1. EXECUTIVE SUMMARY



CLIMATE SOLUTIONS IN FOOD SYSTEMS



We cannot achieve the Paris Agreement goals without transforming our food systems as they account for a third of global greenhouse gas emissions.

Governments must slash emissions from food systems and boost natural carbon sinks that draw down carbon from the atmosphere to mitigate climate change.

The Paris Agreement sets an ambitious goal for climate change mitigation that requires urgent action in all sectors. **Parties agreed to limit the increase in global average temperature to well below 2°C above pre-industrial levels, while pursuing efforts to limit warming below 1.5°C by the end of the century.** For food systems, this implies a rapid transition away from emission-intensive production and toward agricultural practices and land uses that boost carbon sinks.

The Paris Agreement makes specific references to mitigation and adaptation in food systems. The Nationally Determined Contributions (NDCs) under the Paris Agreement provide a platform to bring all policy priorities together and plan and implement food systems measures in a holistic manner. NDCs are at the heart of the Paris Agreement and the achievement of long-term climate goals. They embody efforts by each country to reduce national emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive

NDCs that it intends to achieve. NDCs present a key opportunity for identifying domestic mitigation and adaptation needs and measures to tackle climate change through food systems.

Through an analysis of Nationally Determined Contributions (NDCs), this paper shows that while more and more countries are recognising that food systems are a crucial part of climate action through their international pledges, additional measures and implementation of these plans are needed. As of September 30, 2022, 160 Parties to the UNFCCC (which includes the EU-27 representing 27 member states of the European Union) have submitted 134 updated or revised NDCs. This paper assesses how these updated NDCs integrate food systems measures, and how this has changed compared to their previous versions.

WWF's #NDCsWeWant Checklist aims to shine a spotlight on all kinds of progress, encourage best practices, identify key challenges, and call out laggards, with the goal of increasing the overall ambition of the NDC process. Food systems measures are considered as an important area in a NDC's contribution to sustainable development, alongside linkages with the Sustainable Development Goals (SDGs). To complement the work on the #NDCsWeWant, this report focuses on the integration of food systems in NDCs.



KEY FINDINGS FROM ASSESSMENT OF INTEGRATION OF FOOD SYSTEMS MEASURES IN NDCs:

Overall, there is a positive trend in the recognition of food systems as part of climate solutions. Most of the 134 updated NDCs (93%) include at least one measure related to food systems. This is an increase from 79% of previous NDCs. 106 Parties improved the integration of food systems in their updated NDCs compared to their previous NDCs, while for 17 there was no change and for 11 there was a decline.



HOLISTIC FOOD SYSTEMS APPROACH

Only 19 updated NDCs include measures for both sustainable food production and for reducing food loss and waste.

Only 5 updated NDCs include measures for both sustainable food production and consumption.

Only 2 updated NDCs have measures for sustainable food production, addressing food loss and waste, and shifting to sustainable and healthy diets.



SUSTAINABLE AGRICULTURE

94 updated NDCs have included specific mitigation measures for agriculture, an increase from 58 previous NDCs.

101 updated NDCs included adaptation measures for agriculture, an increase from 87 of the previous NDCs.

63 updated NDCs have mitigation measures that explicitly consider sustainable livestock, an increase from 27 previous NDCs.

55 updated NDCs mention climate-smart agriculture, livestock or forestry techniques as part of holistic food production systems, compared to 28 previous NDCs.

15 updated NDCs explicitly include agroecology, compared to 11 previous NDCs.

70 updated NDCs include agroforestry, compared to just 49 previous NDCs.



FOOD LOSS AND WASTE

36 updated NDCs consider post-harvest food systems measures, compared to 21 previous NDCs.

19 updated NDCs included food loss and waste, compared to two previous NDCs.



ECOSYSTEM CONSERVATION

131 updated NDCs mention at least one ecosystem compared to 122 previous NDCs. **77 updated NDCs** included more ecosystems than was included in previous NDCs.

86 updated NDCs consider marine or coastal ecosystems, compared to 77 previous NDCs.

77 updated NDCs included wetlands, compared to 42 previous NDCs.

93 updated NDCs included specific mitigation measures for forests, an increase from 67 previous NDCs.

49 updated NDCs consider mangroves, an increase from the 32 previous NDCs that consider this component of coastal ecosystems.

33 updated NDCs consider savannahs or grasslands, an increase from the 13 previous NDCs.



EQUITY CONSIDERATIONS

64 updated NDCs have explicitly considered the role of IPLCs compared to 45 previous NDCs.

50 updated NDCs explicitly mention the role of smallholder farmers, compared to 24 previous NDCs.

85 updated NDCs include food security considerations, a 29% increase from 66 of the previous NDCs.



SUSTAINABLE FISHING AND AQUACULTURE

54 updated NDCs have fish and aquaculture in the adaptation measures, an increase from 35 previous NDCs.



DIETARY CONSIDERATIONS

Five updated NDCs include dietary shift measures, compared to one previous NDCs.

RECOMMENDATIONS:

Transforming food systems at the global level requires collective efforts supporting:

- 1. A global shift to nature-positive production:** Governments should integrate nature-positive food production systems, based on the 10 agroecological principles established by Food and Agriculture Organization (FAO), into nationally determined climate pledges and actions. These sustainable and regenerative practices enhance the richness and abundance of biodiversity in land and water and rehabilitate the functions of degraded natural systems to deliver a climate-positive future in which people and nature can thrive.¹
- 2. Reduction in food loss and waste and increase in circularity:** Food loss and waste is a major cause of emissions and over-use of resources and land. There needs to be an increasing emphasis on circularity to reduce emissions and build more resilient and sustainable food systems.
- 3. A transition to healthy and sustainable diets:** A transition to diets that are based on local food contexts and produced within planetary boundaries can reduce GHG emissions, protect and restore wildlife, reduce land-use, and improve health and nutrition.
- 4. Collaboration at all levels of the food systems:** A transformative food systems approach to climate change needs to be inclusive and collaborative where all stakeholders are involved in designing and implementing relevant interventions.

At the national level, all countries should strengthen their national climate plans and help to raise global ambition by better incorporating food systems measures in next rounds of 'ratcheting up' their NDCs. Enhancing NDCs for food systems should include the following steps:

- 1. Inclusion of all parts of food systems in NDCs:** By examining food systems as a whole, from production to consumption, national policymakers should work together with relevant stakeholders across food systems to prepare and implement NDCs. This includes reducing food loss and waste and a shift to healthy diets, which are not considered at the moment.
- 2. Greater inclusion of agroecology to enhance food system transformation for mitigation and adaptation:** Agroecology and agroforestry both advance ecosystem diversification, which in turn provides livelihood diversification and poverty alleviation, while also advancing decarbonization.
- 3. Greater focus on aquatic ecosystems for food production:** Management, conservation, and restoration of all ecosystems can advance food security and there can be even greater ecosystem integration into NDCs than now. This includes the greater consideration of the role aquatic healthy ecosystems like wetlands, peatlands, and mangroves can have in mitigation, adaptation and in food systems overall.
- 4. Increase post-harvest measures, including circularity, food waste and food loss prevention measures, and dietary changes.** FAO recommends a food systems approach that addresses food losses and waste in the context of other policy priorities such as food security and sovereignty, public health and nutrition, and poverty alleviation and livelihoods.
- 5. Increase engagement with smallholder farmers, IPLC, women, and youth.** Meaningful engagement with key food systems stakeholders is essential to NDC development and implementation to drive mitigation and adaptation goals, while also considering equity.
- 6. Inclusion of quantified and measurable targets and milestones for food systems measures in NDCs.** Clear targets and milestones that can be measured can help to monitor and track progress over time at the national level and as part of Global Stocktake under the Paris Agreement.

EXAMPLES OF INTEGRATION OF FOOD SYSTEMS MEASURES IN NDCS



AGROECOLOGY

Côte d'Ivoire, includes in its updated NDC plans to develop an agroecological approach to land-use (e.g., soil fertility management practices, development of the use of organic fertilizers and compost from household waste, the association of agriculture and livestock) and to improve silvicultural species, promote agroforestry, restore degraded lands.



EQUITY MEASURES

Paraguay includes plans in its 2021 updated NDC to promote the exchange of sustainable productive practices carried out in ecosystems, taking into consideration the knowledge and vision of Indigenous Peoples and Local Communities. Paraguay also plans to promote the participation of women in the generation of economic alternatives through conservation and restoration actions and to increase the food security of family farmers and Indigenous Peoples through productive practices with a focus on adaptation and access to markets for the commercialization of their products.



FOOD WASTE

The United Arab Emirates expands on its food loss and waste measures in its 2022 NDC. The food loss initiative, called the Ne'ma initiative, will align and gather the efforts of government entities, the private sector, NGOs, and communities across the nation to collectively address food loss and waste in the UAE as the country aspires to cut food waste in half by 2030

As part of this initiative, the UAE has a nationwide Food Waste Pledge, launched in 2018, to encourage the UAE's hospitality sector to adopt efficient food management practices, a goal that was in the country's 2020 NDC. The UAE expands this goal to include more stakeholders as the 2022 updated NDC includes plans to incorporate stakeholders through the whole food value chain, including at farms, manufacturers, distributors, retailers, restaurants, or households.



DIET CONSIDERATIONS

Costa Rica introduced new plans in its 2020 updated NDC to develop "Adapted Food Guides" in two of the country's territories. These guidelines will have maps and information that promote the consumption of Indigenous, traditional, and seasonal agricultural and food products, highlighting their nutritional value, and their contribution to the protection of cultural heritage, the reduction of emissions, and food security.

By encouraging local food crops, this measure promotes "neglected and underutilized species" (NUS). NUS are plants, animals, and fungi that are native to the environments in which they are grown, are adapted to local conditions, and require fewer external and economic inputs than conventional crops, thus producing fewer GHG emissions.

A photograph of a person and a child walking away from the camera through a field of tall grass. The person is wearing a blue jacket and a colorful beanie, and the child is wearing a blue hoodie. They are holding hands. In the background, there are rolling hills, trees, and a sunset sky with orange and pink clouds. A yellow box is on the ground near the child.

2. THE CASE FOR INTEGRATING FOOD SYSTEMS MEASURES IN NDCS

Food systems account for 29% of global greenhouse gas emissions², and the food sector alone already exceeds the world's carbon budget to keep warming to no more than 1.5°C in the next 40 years.³ Food systems encompass the elements (e.g., environment, people, inputs, processes, infrastructures, institutions) and the activities that relate to the production, processing, distribution, preparation and consumption of food, as well as their socio-economic and climate change impacts.⁴

The negative impacts of climate change on food systems – including on food production, water security, health and well-being – are already being felt across regions and countries, hindering efforts to meet Sustainable Development Goals. The *IPCC Sixth Assessment Report on Climate Change Impacts, Adaptation and Vulnerability* published in March 2022 states that if global emissions continue on the current trajectory, food production in some regions will become impossible, and it will become costlier to prevent food spoilage and maintain quality across the globe. The increasing number of extreme weather and climate events triggered by climate change have already exposed millions of people

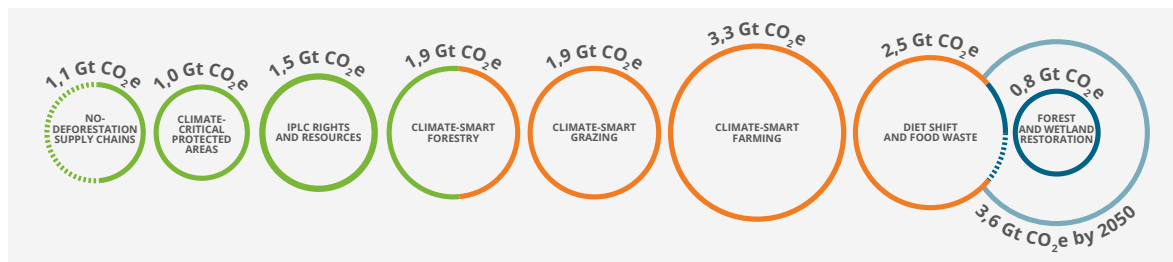
to acute food and water insecurity. Losses of food production and lack of access to food, compounded by decreased diet diversity, have increased malnutrition in many communities. Indigenous Peoples, small-scale food producers, and low-income households are particularly impacted.

Emissions reductions in food systems can be achieved by taking concrete actions to protect, sustainably manage, and restore natural ecosystems. The recently launched [Exponential Roadmap for Natural Climate Solutions](#) describes how to slash land emissions and boost natural carbon sinks, to move from 12.5 GtCO₂e of greenhouse gas emissions from land each year, to net zero by 2030, to 10 GtCO₂e absorbed by carbon sinks by 2050 (see figure 1)⁵.

These solutions must be based on better stewardship of natural ecosystems and landscapes, focusing on people living and working on the land, primarily farmers, ranchers, foresters, Indigenous People and Local Communities (IPLC), and public land managers.

Figure 1. Mitigation potential from various food systems measures.

Source: Conservation International (2022). [Conservation.org/roadmap](https://conservation.org/roadmap)





A global transition to regenerative production practices, shift towards healthy diets, and reduction of food waste and loss through culturally and agro-ecologically diverse actions – including recognising and supporting the different dimensions of local and Indigenous food systems – is required to achieve climate change mitigation across regions and countries.^{6,7} Such a holistic approach requires complementary interventions on both the supply-side (such as sustainable food production practices) and on the demand-side (focusing more broadly on consumer and industry behaviour such as dietary change, reduction of food loss and waste) of food systems.⁸

The preamble of the Paris Agreement makes specific reference to “safeguarding food security and ending hunger, and the particular vulnerabilities of food production systems to the adverse impacts of climate change.” The Preamble also refers to human rights, gender, ecosystems and biodiversity, all issues that are central to agriculture. Similarly,

Article 2.1 of the Agreement states, “the Agreement aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by ... increasing 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....”

The Nationally Determined Contributions (NDCs) under the Paris Agreement provide a platform for each Party to bring all policy priorities together to plan and implement food systems measures in a holistic manner. NDCs should ideally embody efforts by each country to reduce national emissions and adapt to the impacts of climate change. The objective of this paper is to assess the integration of food systems actions in the NDCs and how integration has evolved from previous versions of NDCs to the updated versions submitted in the past two years.

BOX 1: NATIONALLY DETERMINED CONTRIBUTIONS IN THE UNFCCC PROCESS

The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive Nationally determined contributions (NDCs) that it intends to achieve.

NDCs are central to the Paris Agreement as Parties are to submit their NDCs containing their domestic plans to the UNFCCC Secretariat. Regardless of a Party’s implementation plan or status of its existing NDC, Parties are requested to submit a new or updated NDCs every five years starting in 2020, five years after the 2015 signing of the Paris Agreement. As of October 2022, 134 Parties have submitted at least two NDCs, out of the 192 Parties to the Paris Agreement.



3. METHODOLOGY AND APPROACH

This paper reviews the previous and updated NDCs⁹ of the 134 Parties (including the European Union) to the Paris Agreement that submitted an updated NDC to the United Nations Framework Convention on Climate Change (UNFCCC) as of September 30, 2022. The NDCs were reviewed to determine if and to what extent food systems measures are incorporated in these climate plans.

The review and analysis involved three steps:

- 1. Gathering qualitative information from each NDC:** An assessment framework identified information related to food systems in each NDC. Qualitative information was gathered through a key-word search of terms related to food systems including equity considerations, co-benefits, and ecosystems in each NDC. The keyword search assessment is available in the Annex 2.
- 2. Assessing the quality of food systems measures in NDCs:** An analysis framework gauged the degree and scope of food systems measures within all updated NDCs and compared this with the previous versions of these NDCs.
- 3. Identifying trends and gaps:** Trends in updated NDCs and previous NDCs and between the NDCs of individual countries were identified to determine if and how updated NDCs have changed regarding incorporation of food systems measures.



4. FINDINGS



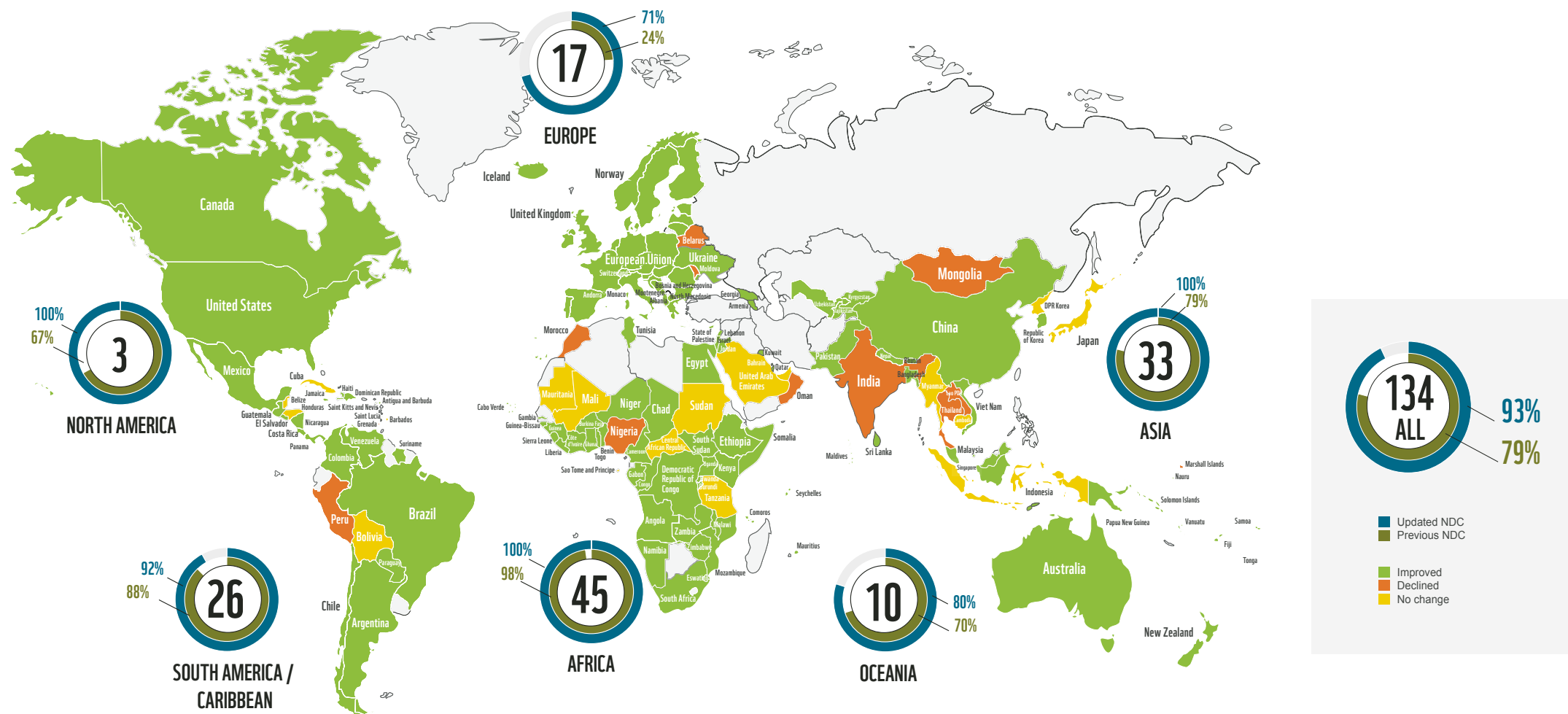
4.1 GENERAL TRENDS IN INTEGRATING FOOD SYSTEMS MEASURES IN NDCs

93% (125) of updated NDCs include at least one measure related to food systems. This is an increase from 79% (107) of previous NDCs.

106 Parties improved the integration of food systems in the updated NDCs compared to their previous NDCs, while for 17 there was no change and for 11 there was a decline (see Figure 2). Assessment of “improvement” considered whether food systems measures were mentioned

for both mitigation and adaptation in the NDCs, whether ambitious quantitative targets were specified, how many different ecosystems were incorporated, and whether equity considerations like the role of IPLC communities were recognised.

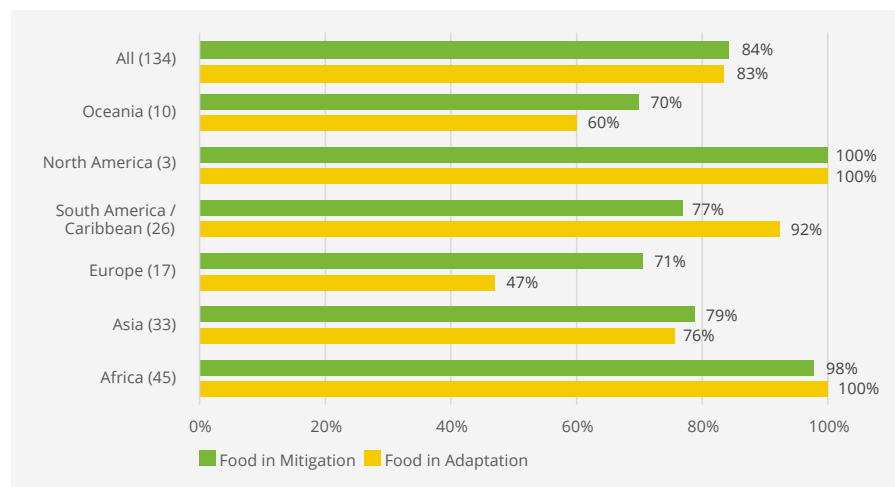
Figure 2. Trends in integration of food systems in NDCs



98 updated NDCs consider food systems in both mitigation and adaptation, a 26% increase compared to 78 previous NDCs.

The increased integration of food systems in climate pledges can be seen in mitigation measures. 112 updated NDCs included food systems in their mitigation plans, compared to 89 previous NDCs – a 26% increase. The number of NDCs mentioning food systems in adaptation measures increased from 95 to 111. Uptake of food systems in updated NDCs varies across geographic regions, with the lowest rate of integration in NDCs from Europe and Oceania. Among 17 Parties (including the European Union 27) in Europe, 12 included food systems in their mitigation measures and 8 in adaptation while almost all 45 Parties in Africa included food systems for both mitigation and adaptation.

Figure 3. Integration of food systems in updated NDCs



4.2 FOOD SYSTEMS MEASURES AT THE PRODUCTION LEVEL

4.2.1 Positive trends

94 updated NDCs have included mitigation measures for agriculture, an increase by 62% from 58 previous NDCs. 101 updated NDCs included adaptation measures for agriculture, a 16% increase from 87 previous NDCs.

In addition to including more measures, updated NDCs also include clearer targets and more details on the actions planned to be implemented. For example, **Bangladesh** aims to reduce methane emissions from rice cultivation by transitioning to Alternate Wetting and Drying (AWD) irrigation, a rice cultivation technique in 20% of all rice cultivation by 2030. In its updated NDC,

Bangladesh makes this measure more specific as it states plans to transition 50,000 hectares of rice fields to AWD unconditionally, and another 100,000 hectares conditional on international finance, clarifying the amount of land and setting clear quantitative targets with specific finance allocation needs for implementation.¹ **Bangladesh's** updated NDC expands on this agricultural mitigation and adaptation measure as it includes plans to reduce emissions through changing the variety of rice that they produce for 1.1 million ha of crop lands and improving nitrogen-based fertiliser management in 50,000 ha, unconditionally. If finance contributions are met, the surface area of land for rice crop species diversification and fertiliser management techniques will double, having clear land targets.

¹ Depending on precise implementation, recent studies have found that AWD growing methods can reduce methane emissions in rice cultivation from 40% up to 90%. Adhya, T. K., Searchinger, T., Linquist, B., Wassman, R., & Yan, X. (2014). Wetting and Drying: Reducing Greenhouse Gas Emissions and Saving Water from Rice Production. *World Resources Institute*. Retrieved September 15, 2022, from <https://www.wri.org/research/wetting-and-drying-reducing-greenhouse-gas-emissions-and-saving-water-rice-production>.

In its updated NDC, the **Dominican Republic** includes plans to transition existing coffee cultivation to low carbon methods. Specifically, it aims to have 75,102 ha by 2035 under sustainable, low carbon coffee production and management, which has the potential to reduce emissions of 5 MM tCO₂eq. The **Dominican Republic** also aims to implement a similar climate-smart agricultural plan with cocoa cultivation working with small-scale cocoa farmers with a reduction potential of 2.2 MM tCO₂eq, in a total area of 146,648 ha over a 10-year period. Neither of these measures are in the **Dominican Republic's** 2015 NDC and demonstrate a marked improvement in food system inclusion and integration in its mitigation plans.

In its updated NDC, **Liberia** pledges to reduce agricultural GHG emissions by 40% below Business As Usual (BAU) levels by 2030 (reduction of 13 GgCO₂e) through promoting low-emissions rice cultivation and reducing the burning of fields. **Liberia** will incentivise no/low tillage, agro-silvo-pastoral systems, improved lowland rice cultivation, multi-cropping, organic fertilisers, composting, and crop rotation. This is a measurable and actionable intervention compared to Liberia's first NDC, which had no quantitative agricultural mitigation measures.

63 updated NDCs have mitigation measures that explicitly consider livestock, a 133% increase from 27 of the previous NDCs that did so.

Mitigation measures for improved livestock management across updated NDCs include sustainable management of pasture and grazing lands, better feeding practices, improved breeding, sustainable treatment of livestock residues, and maintaining livestock population at appropriate levels.

Rwanda includes in its updated NDC plans to improve livestock husbandry by replacing 10% of its domestic cows with an improved cow species, promote sustainable livestock feed (legume fodder species), and implement more efficient manure management systems, including collective farms and farmer' training. It also plans to change its livestock mix through expanding fish farming, poultry, and other small livestock to increase food supply without increasing cows.

Through these measures **Rwanda's goal** is a reduction in Methane (CH₄) emissions from enteric fermentation and reduction in GHG emissions from manure while maintaining food supply. **Guatemala** includes plans in its updated NDC reduce emissions and increase CO₂ removal on 300 cattle farms. **Guatemala** is also developing a national strategy for sustainable low-emission cattle sector that includes the adoption of intensive rotational grazing practices and improved pasture management on at least 40,000 ha, better manure management, and the implementation of silvo-pastoral practices among other sustainable husbandry practices. This plan estimates that it will achieve an emissions reduction of 0.6370 million tons of CO₂-eq. Both **Rwanda** and **Guatemala's** initial 2015 NDCs did not consider specific livestock measures at all.

55 updated NDCs mention climate-smart agriculture, livestock, or forestry techniques, a 96% increase compared to 28 of the previous NDCs.

Climate-smart techniques applied to livestock grazing, forestry, and farming could provide additional emissions reductions of up to 7.1 GtCO₂e per year globally.¹⁰ These include measures like soil and cover crop management, integrating trees to grazing areas, and other regenerative farming practices that can significantly increase carbon sequestration, while increasing biodiversity and resilience to climate risks. Similarly, adding trees to grazing areas and diversifying fodder can improve animal health and create new livelihood opportunities for livestock managers.¹¹ **Saint Kitts and Nevis'** first NDC does not consider food systems at all. In its updated NDC, it aims to implement climate-smart agriculture, specifically highlighting the co-benefits that these land management techniques can have, like increasing food and nutrition security and resilient rural livelihoods. Similarly, **Mozambique's** first NDC only considers agriculture in broad strokes, but its updated NDC is much more detailed. **Mozambique's** updated NDC pledges to promote conservation and climate-smart agriculture, while also promoting integrated agroforestry systems to recover degraded areas, as part of the country's plan to develop and implement low carbon agricultural practices, a joint mitigation and adaptation intervention.

4.2.2 Areas for improvement

While many Parties have increased their deployment of interconnected land use management techniques, specifically climate-smart agriculture, agroecology and agroforestry, at least 38% of updated NDCs still do not mention any of these techniques.

Only 15 updated NDCs explicitly include agroecology, compared to 11 previous NDCs: an increase of only four countries.

Agroecology, a holistic land management technique, has climate mitigation and adaptation benefits as well as positive impacts on pollination diversification, pest control, nutrient cycling, water regulation and soil fertility, soil carbon regulation, and soil carbon.¹² **El Salvador's** updated NDC pledges to implement agroecology bio-fertilisers for corn, beans and coffee, a measure not included in its previous NDC. While **Venezuela's** first NDC mentions a few agroecology principles, its updated NDC expands the application of agroecology across several interventions. In its 2021 NDC, **Venezuela** pledges agroecological crop production to reduce the toxicity, through regulating or prohibiting the use of highly toxic synthetic pesticides, carrying out capacity-building sessions to train 200,000 farmers on agroecology production techniques, and produce 20,000 litres of biofertilizer.

70 updated NDCs include agroforestry measures, compared to just 49 of previous NDCs. While this is a significant increase, it represents just half of the updated NDCs.

Agroforestry is a sustainable land management technique and a regenerative farming solution that involves integrating trees into croplands and pastures. Agroforestry is a subset of agroecology with a specific focus on incorporating trees. Research shows that introducing a limited number of trees into farms provides carbon benefits without reducing crop productivity.¹³ Despite barriers to adoption of agroforestry including culture, cost, and the slow growth rates of trees, agroforestry has the potential to sequester 0.2 GtCO₂e per year by 2030, accelerating to 1.4 GtCO₂e per year in 2050.¹⁴ The uptake and integration of agroforestry is more common in updated NDCs than agroecology.

Albania includes several agroforestry measures in its updated 2021 NDC, which is a change from its first 2016 NDC that did not include food systems at all. **Albania** plans to progressively increase land managed by agroforestry, reaching 100 ha in 2030 with the goal of increasing carbon storage in soils in areas. It also plan to implement agroforestry practices on pastures, changing livestock husbandry and pasture management, to integrate and diversify crop production, also framing agroforestry as an adaptation practice.

Honduras's first NDC pledges the afforestation/reforestation of 1 million ha of forest by 2030. In **Honduras's** updated NDC, it expands this goal qualitatively and quantitatively, committing to promote the implementation of the conservation and functional restoration of the rural landscape reaching 1.3 million ha of forest under restoration – an increase of restoration activities on 300,000 ha from the one million ha of reforestation committed in its first NDC; and adopting sustainable agroforestry practices that contribute to mitigation, improved resilience, employment generation, and food security. As part of this intervention, Honduras's updated NDC states that agroforestry techniques will specifically aim to reduce emissions related to coffee and livestock cultivation.

Only nine updated NDCs consider sustainable fishing and aquaculture in mitigation measures, compared to one previous NDC. 54 updated NDCs have fish and aquaculture in their adaptation measures, an increase from 35 previous NDCs.

Approximately 540 million people are dependent on fisheries and aquaculture as a source of protein and income, according to FAO.¹⁵ Simultaneously, there are more fossil-fuel dependent fishing vessels in operation than necessary to catch the available global fish resources efficiently and the economic losses due to overfishing, pollution, and habitat loss are estimated to exceed US\$50 billion per year.¹⁶ Meanwhile, the sector remains behind in the mitigation and adaptation action needed to transform food systems.

In its 2021 NDC, **Mauritius** lists several fishery and blue economy mitigation measures including: 1) gathering increased information on GHG emissions from the fishery sector and aquatic food production regarding fuel and energy use, market forces and the management of fishing capacity, feed and fertilisers for aquaculture; 2) development of climate smart fishery and aquaculture based on sustainable management plans to reduce GHG emissions during the fishing and production stages and throughout the entire value chain (processing, transport and marketing activities), and 3) research regarding the potential of aquaculture for carbon sequestration. This is an expansion from **Mauritius'** previous NDC, which only considered fishing in adaptation. **China**, in its updated NDC, pledges to develop, test, demonstrate, and promote energy-saving and emission-reduction technology and equipment in agriculture and fishery

sectors whereas China's first NDC did not consider fishery measures. **Egypt**, in its updated NDC, aims to strengthen the implementation of good fishing practices in both the Mediterranean and the Red Sea to protect marine life and its ecosystems as an adaptation measure. Fishery measures are not included in its first NDC either. **South Sudan** in its updated NDC includes aims to enhance climate-resilient fish production by promoting activities like the cultivation of indigenous fish species, fish farming, the restoration of fishery habitats, and improving the supply chain of the fisheries industry (e.g., supporting transport activities and cold storage) as a joint mitigation and adaptation measure. **South Sudan's** first NDC only mentions fishing in the greater context of promoting climate-smart agriculture for adaptation purposes, demonstrating the expansion of breadth and depth of its updated NDC.

4.3 FOOD SYSTEMS MEASURES AT POST-HARVEST LEVEL

Globally, in 2020, it was estimated that more than 13% of food harvested was lost at post-harvest stages (through the farm, transport, storage, wholesale and processing value chain steps).¹⁷ Food loss levels differ depending on regions, with sub-Saharan Africa seeing the highest loss at 21.4%, Eastern and South-Eastern Asia at 15.1 %, Latin America and the Caribbean at 12.3%, and Europe and Northern America which has a food loss rate of 9.9%.¹⁸ Food loss is the amount of food spoiled from the point of production (harvest) up to, but not including the retail or consumption level; food is lost largely due to lack of necessary storage facilities, delays in transport, and distribution.

According to the World Food Program, in some developing countries, small-holder farmers can regularly lose 40% of their harvest due to inadequate storage.¹⁹ Because of this fear of food loss, these farmers sell their produce immediately after harvest—when prices are low due to high supply – only to face food and income insecurity themselves and buy crops later at higher prices. Building local storage can prevent this and enhancing food storage and security can reduce GHG emissions associated with agricultural production.

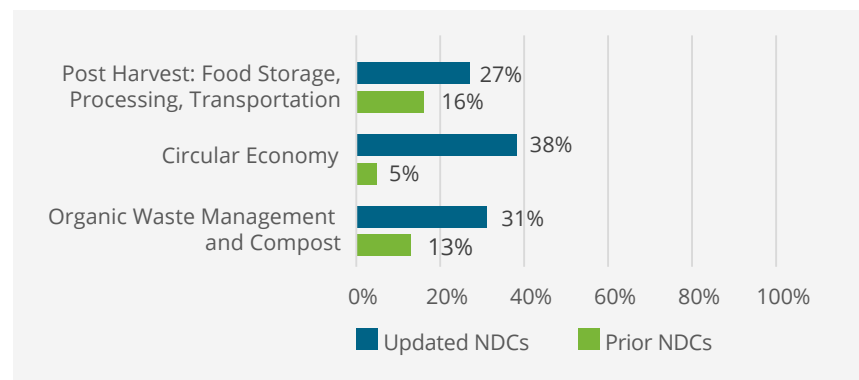


4.3.1 Positive trends

36 updated NDCs consider post-harvest food measures, a 71% increase compared to 21 previous NDCs.

Post-harvest measures – measures to mitigate food loss beyond farm – are essential because they can prolong the lifespan of food commodities and reduce food loss, reducing the need to produce more food and associated GHG emissions. Post-harvest measures can include a range of measures from food processing, like increasing dehydrators to preserve fish that would otherwise spoil, to storage and transportation infrastructure (like grain silos and cold storage refrigeration), and food safety pest monitoring.

Figure 4. Trends in adoption of measures in NDCs to address food loss



Malawi's updated 2021 NDC includes storage and processing post-harvest measures that are not in its initial NDC: predominantly, the promotion of metallic silos and Purdue Improved Crop Storage (PICS) bags for effective grain storage. Malawi aims to upscale post-harvest management by explicitly linking it to disaster risk management and promoting post-harvest practices that reduce food storage losses and increase resiliency in value chains. **Somalia's** updated NDC also includes post-harvest provisions while its previous NDC did not. Somalia pledges to improve and establish marketing systems and infrastructure for the agriculture sector, including cooling systems for perishable goods, and market facilities and infrastructure for crops and livestock in urban

centres. Somalia aims to support small- and medium- enterprises and farmers to increase value of the crop and livestock production chain. **Viet Nam** plans to improve the fishing port systems towards an industrial and modern direction; improve the information systems for managing fishing ports as well as storm shelters for fishing boats; and increase information exchange between fishing ports and typhoon shelters. These measures in Viet Nam's updated NDC are an expansion of post-harvest transportation infrastructure from its previous NDC which just states that fishing boats should have sufficient communication equipment. **Cambodia's** updated NDC pledges to efficiently mechanise and improve processing and packaging agriculture infrastructure to extend the agriculture value chain, a novel measure compared to its previous NDC.

51 of all updated NDCs consider the circular economy, a marked improvement from the mere seven of the previous NDCs that did this.

Circular economy plans are included in the post-harvest segment of the food value chain for the purposes of this analysis, acknowledging that there is an overlap between post-harvest measures, waste management and waste reduction measures. Circular economy is a regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing energy and material loops.²⁰ One circular food-system intervention is to use either organic food waste or by-products from crop production to feed livestock – as this could free up 300 to 450 million ha of land that is currently used to grow livestock feed.²¹ **Chile's** updated NDC details its plans to develop a Circular Economy Roadmap for the years 2020 to 2040, at a national level, a new inclusion compared to its first NDC. Part of its Circular Economy initiatives is the development of a National Organic Waste Strategy, aimed at increasing the recovery of organic waste generated at municipal level by recovering nutrients and organic materials that can then be re-used or repurposed. Compost can be re-used as organic fertiliser, reducing the need for GHG intensive chemical synthetic fertiliser. **Moldova** pledges in its updated NDC to promote circular economy approaches for reutilizing, recycling and repurposing the resources that can lead to the improvements in food production; circular economy is not mentioned in its previous NDC.

43 updated NDCs have included compost or organic waste management in their mitigation or adaptation measures, a 153% increase from previous NDCs.

This includes only NDCs that mentioned compost or organic waste explicitly as part of their mitigation or adaptation measures. It excludes general solid waste management interventions or targets. Organic waste management measures can reduce methane production from landfills and simultaneously provide a benefit to food systems as diverted organic waste can be fodder for livestock or a fertiliser and agricultural input for crops and reforestation projects, increasing soil carbon sequestration.²²

Nauru's updated NDC includes the country's aims to construct a new composting facility, which would improve food security in the country by producing a fertiliser and growing medium for local food production while also reducing methane emissions from landfills, an intervention that is not in Nauru's previous NDC.

Bhutan in its updated NDC states that the National Waste Management Strategy, which was adopted in 2019, aims to reduce the over 80% of solid waste currently going to the landfill to less than 20% by the year 2030. **Togo**, specifically in the agricultural sector of its updated NDC, pledges to promote the transformation of 5% of manure and agricultural residues into compost (organic fertilizer) and/or biogas, thereby reducing the use of chemical fertilizers by 3% and aims to recover 12% of municipal solid waste by 2030 by composting in the major cities. Togo's previous NDC did not include any such measures for organic waste management.

4.3.2 Areas for improvement

19 updated NDCs consider food waste reduction, compared to only three Parties in their previous NDCs. Five updated NDCs mention dietary shift measures, compared to one of the previous NDCs.

A shift toward healthier diets with an emphasis on more plant-based foods, while reducing food loss and waste globally, can increase mitigation by as much as 2.5 GtCO₂e per year.²³ In richer countries, where overconsumption of animal-based foods is a major health concern and driver of climate change, dietary shifts provide major health and environmental benefits – including by reducing the pressure to convert lands for livestock, while enabling poorer countries to tackle under-nutrition by using existing cropland to deliver more calories to people per hectare.²⁴

However, only a handful of Parties – mostly developing countries – have set targets and measures to reduce food loss and waste or promote dietary changes. While post-harvest measures may have the impact of extending the lifespan of food, and thereby reducing food waste and food loss, measures in NDCs are not counted as food waste or food loss measures unless they explicitly state this as an objective. **China** considers food waste as a joint mitigation and adaptation measure with its national “empty-plate” public awareness campaign to reduce

food waste. In its 2021 NDC, **the Gambia** set a mitigation target of 131,000 tCO₂e in 2030 by reducing food loss and waste, a contribution that was not included in its first NDC. **The Gambia** plans to do this through several post-harvest measures including improved harvesting techniques, hermetic bag or metal silo storage to limit exposure to moisture, heat and pest infestation, deployment of mobile processing units, solar dryers, graters and pressers, where applicable, aggregation points that help bring the product to market, and improved transport conditions and cold storage. **Sri Lanka** pledges to reduce post-harvest losses and increase the value chain of fruits and vegetables specifically. These measures, all mentioned in **China, Gambia, and Sri Lanka's** updated NDCs, are not mentioned in their previous NDCs.

Regarding dietary shifts and guidelines, in its updated NDC, **Eswatini** includes a measure for promoting healthy eating and healthy lifestyles in line with adaptation needs. **Costa Rica** plans to produce “Adapted Food Guides” in two of the country's territories with maps and information that promote the consumption of indigenous and traditional seasonal agricultural and food products, highlighting their nutritional value, their contribution to the protection of cultural heritage, and the reduction of emissions and food security. These food guides are not in **Costa Rica's** previous NDC.



4.4 MEASURES TO CONSERVE, SUSTAINABLY MANAGE, AND RESTORE NATURAL ECOSYSTEMS

Countries must significantly increase the area of natural ecosystems under protection and sustainable management to address the climate and biodiversity challenges. Food systems account for 90% of tropical deforestation and are the primary driver of biodiversity loss.^{25,26} Protection of areas most at risk of conversion around the world would provide emissions savings of about 1 GtCO₂e per year by 2030.²⁷ However, this must be based on fair and equitable approaches in collaboration with IPLCs who are the stewards of most of these ecosystems.

4.4.1 Positive trends

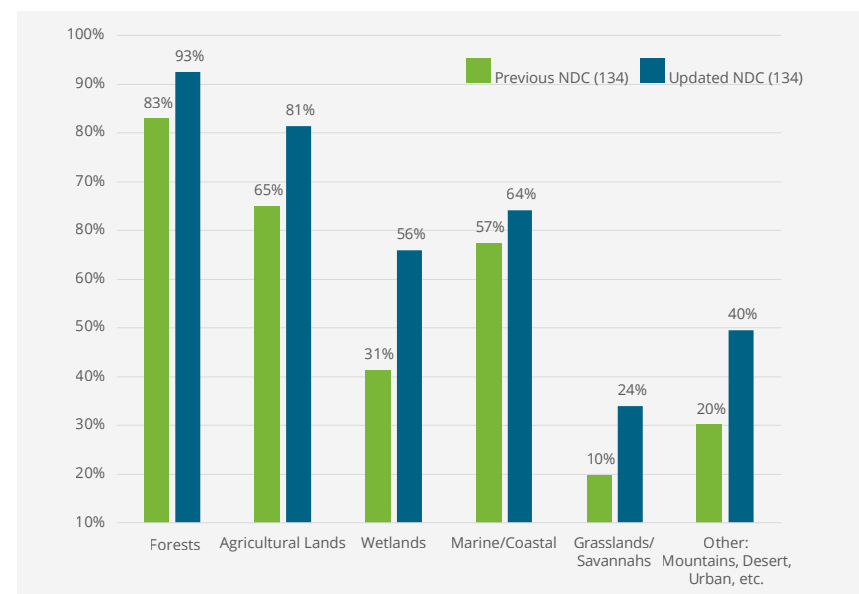
Almost all updated NDCs (98%) refer to at least one ecosystem, compared to 91% of previous NDCs. 77 Parties included more ecosystems in the updated NDCs than in their previous submissions.

Forests and agricultural lands are the most prominent ecosystems in both previous and updated NDCs (see figure 5). 93% of the updated NDCs reviewed consider forests and 81% consider agricultural crop lands, a 12% and 25% increase respectively from the previous NDCs. Meanwhile, the inclusion of other key ecosystems such as wetlands, grasslands, and marine ecosystems is lower but has increased considerably in updated NDCs.

93 updated NDCs included specific mitigation measures for forests, a 39% increase from 67 previous NDCs.

Forest ecosystems are important sources of food for the 1.6 billion people globally living within 5 km of forests, and they are key to climate change mitigation.²⁸ A recent survey finds that tropical forest communities obtain up to 14.8% of their fruits and vegetables from forests.²⁹

Figure 5: Inclusion of ecosystems in NDCs, out of 134 Parties that submitted an updated NDC.



Forests and land-use is the only economic sector with potential to become a net emissions sink. Sequestering more carbon than it is producing globally,³⁰ the sector is already playing a vital role in slowing the rise of emissions in the atmosphere. The implementation of policies to end deforestation from commodity production would avoid deforestation equivalent to more than 1.0 Gt of emissions per year by 2030.³¹

Colombia aims to reduce emissions from deforestation by reducing the rate of deforestation to 50,000 ha/year by 2030. The country's first NDC did not include any deforestation or forest measures. **Liberia** aims to reduce GHG emissions and enhance carbon sinks by reducing the national deforestation rate to 50% by 2030 and reforesting an average of 12,285 ha per year to enhance forest carbon stocks by 1,013 GgCO₂e by 2030, including through natural regeneration and tree planting by community and school programs. **Samoa**, in its updated 2021 NDC, aims to reduce GHG emissions in the Agriculture, Forests, and Other Land Use (AFOLU) sector by 26% in 2030 compared to 2007 levels through reforestation, forest restoration, and promoting agro-forestry. **Samoa's** prior NDC did not include forestry in mitigation. Another example of improvements is **Papua New Guinea**, which incorporated quantified forestry mitigation actions in its updated NDC that were not in its previous NDC. In its updated NDC, **Papua New Guinea** pledges to reduce the area of annual deforestation and annual degradation by 25% against 2015 levels (equating to a reduction of 8,300 ha of annual deforestation and 43,300 ha of degradation), and increase the areas of afforestation, reforestation, and ecosystem restoration.

86 updated NDCs consider marine or coastal ecosystems, an increase by 12% compared to 77 of the previous NDCs.

Coastal ecosystems, sometimes called blue carbon ecosystems, include mangroves and seagrass. These ecosystems are key sources of food across the globe – providing 17% of the current production of edible meat.³² However, overfishing and agricultural runoff (i.e., the overuse of fertilizers that run into waterways) is leading to destruction of these ecosystems and rapid loss of marine biodiversity.³³



Conservation and restoration of coastal and marine ecosystems have an annual mitigation potential of 0.32-0.89 GtCO₂e while ocean-derived food production and consumption of sustainably harvested and low-carbon ocean-based proteins has the potential to further reduce emissions by 0.34-0.94 GtCO₂e.³⁴

Kenya will establish at least 2,000 ha to promote nature-based enterprises across the country, including seaweed farming and mangrove tourism, and develop marine spatial planning, integrating the use of nature-based solutions, strengthening the governance of community structures in participatory resource management, and further developing and implementing the national mangrove management plan as part of its coastal ecosystem protection and restoration efforts. These measures were not in **Kenya's** previous NDC.

49 updated NDCs consider mangroves, a 52% increase from 32 of the previous NDCs that included this component of coastal ecosystems.

There are an estimated 4.1 million mangrove fishers worldwide, from small-scale fishers who are dependent on the ecosystem for food and income to commercial fisheries who catch shrimp, among other species.³⁵ Mangroves are also carbon sinks, providing key mitigation benefits as well if they are protected or restored.³⁶ **Barbados**, in its updated NDC, states that its national Water Protection and Land Use Policy is designed to protect groundwater aquifers, coastal coral reefs, mangroves and seagrass beds using nature-based solutions, while advancing mitigation goals and food security. Notably, mangroves were not mentioned in Barbados' first NDC.

4.4.2 Areas for improvement

77 updated NDCs included wetlands. While this is a considerable increase from 42 of the previous NDCs, there is much room for improvement as 170 countries have ratified the Ramsar Convention, a global treaty ratified to protect wetlands and promote their sustainable use.

Approximately 35% of the world's wetlands were lost between 1970–2015 and the loss rate has been accelerating annually since 2000.³⁷ Peatlands – a type of wetland – cover up to 440 million hectares, or about 3% of global land area, and store an estimated 500–600 Gt CO₂e.³⁸ Only 1% of existing peatlands are currently protected, potentially enabling peatlands to be drained for agriculture use and land conversion, which would release carbon dioxide and methane.³⁹ Increasing the area of protected peatlands and restoring peatlands can help (re)store carbon, while simultaneously supporting healthy biodiversity.

In its updated NDC, **Canada** states that it is investing CAD\$631 million to restore and enhance wetlands and peatlands, improve land management practices, and conserve carbon-rich ecosystems, a measure that is not in its previous NDC. Similarly, **Chile's** updated NDC establishes plans to standardise metrics to evaluate the capacity of wetlands (especially peatlands) for climate change adaptation or mitigation, and to implement ecosystem actions to enhance these co-benefits in five pilot sites. **Chile** will also protect at least 20 coastal wetlands as new protected areas by 2025 and protect at least 10% of marine eco-regions (Humboldt, Central Chile, Araucanía, and Chiloé) by 2030, which are new measures from its previous NDC.

33 updated NDCs consider savannahs or grasslands, a 54% increase from the 13 previous NDCs.

While similar to wetlands, this is a major improvement between the updated NDCs and previous NDCs, there is still immense room for improvement given over 75% of updated NDCs do not consider grasslands at all. Grasslands have the potential to play a key role in climate change mitigation through carbon storage and sequestration, as they have an estimated global mitigation potential

of almost 1.5 Gt CO₂e in 2030 from improved grazing land management, with additional mitigation possible from restoration of degraded grasslands.⁴⁰

Pakistan in its updated NDC states its plans to implement its eco-system restoration initiative that sets specific ecosystem rehabilitation goals, including the restoration of 6% of degraded grassland. This goal is not in Pakistan's previous NDC. Similarly, **Argentina** emphasizes and promotes the conservation, restoration and sustainable management of ecosystems, especially native forests, wetlands, peatlands, and natural grasslands as ecosystems that significantly contribute to carbon absorption and storage, reduce vulnerability, and increase the resilience of the communities that inhabit and depend on them. These measures were absent from Argentina's previous NDC.



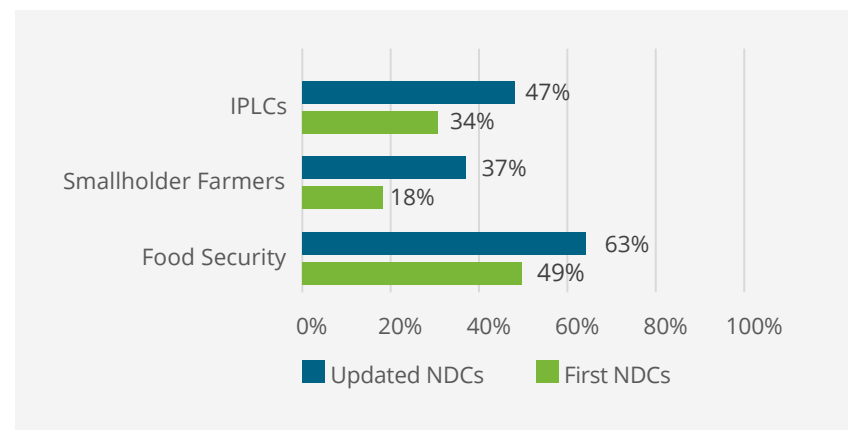
4.5 Equity considerations in food systems measures

In many countries, food systems transformation requires scaling and supporting practices of IPLC, and farmers that have protected and sustainably used ecosystems for centuries. Food system measures must focus on these groups with support from policymakers, the finance sector, businesses, and social movements. According to Conservation International, advancing IPLC rights and resources would result in more than 1.0 GtC2e of avoided emissions annually by 2025, more than 1.5 GtC2e annually by 2030, and nearly 2.0 GtC2e annually by 2050 – predominantly from improved stewardship of tropical forests.⁴¹

64 updated NDCs have explicitly considered the role of IPLCs, a 42% increase compared to 45 previous NDCs.

While this is a positive trend, there is still room for improvement as more than half of the updated NDCs still do not consider IPLC and their role in food systems transformation. **Belize's** updated NDC includes plans to promote land stewardship by IPLC and monitor sustainable management on 10,000 ha of ecosystems that are net carbon sinks, an intervention that was not in its previous NDC. **Belize** also will promote the stewardship of IPLC in coastal lands and explore the development of alternative livelihood plans for fishers, include capacity building and strengthening of fishing organisations, especially in local and Indigenous communities. **Nepal**, in its updated NDC, includes aims to have at least 60% of forests under community-based management, and to have 50% of women and proportional representation of Dalits and Indigenous People on the management committees. Nepal also aims to increase access to climate-smart agricultural technologies for women, Indigenous People, smallholder farmers and marginalised groups. This improved the previous NDC, which mentions Indigenous People, and managerial and financial support measures, but in lesser detail.

Figure 6. Equity considerations for food system measures in NDCs. Total: 134 updated NDCs and 134 previous NDCs.



50 updated NDCs explicitly mention the role of smallholder farmers, a 104% increase from 24 of the previous NDCs.

In **Egypt's** updated NDC, it includes plans to conduct economic risk assessments of climate change in different agricultural areas and to assess the vulnerability of rural communities. It also plans to support small farmers in adapting to climate change through a multi-stakeholder engagement approach, working with farmers, civil society, and agricultural cooperatives, facilitating capacity building for resource management (i.e., soil, water, fertiliser and outputs), and promoting the use of traditional knowledge and nature-based solutions. **Guinea-Bissau** pledges to conduct capacity-building on agricultural techniques and water management for farmers, implement agricultural insurance products that protect farmers from the weather, and generate business opportunities in the field of food safety, processing and conservation for women. For both **Guinea-Bissau** and **Egypt**, these measures were not in their first NDCs.

85 updated NDCs include food security considerations, a 29% increase from 66 of the previous NDCs.

Losses of food production and lack of access to food, compounded by decreased diet diversity, have increased malnutrition in many communities. Indigenous Peoples, small-scale food producers, and low-income households are particularly impacted by food insecurity.⁴² Food security exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food. Governments should ensure any policy action for food is holistic in a way that safeguards food security and sustainable development as enshrined in the Preamble and Article 2.1 of the Paris Agreement.

Fiji, in its updated NDC, commits to strengthening the resilience of its agriculture sector with the explicit aim of ensuring national food security and diversifying the sector by promoting sustainable livelihood opportunities. Food security is not mentioned in Fiji's previous NDC. Similarly, in its updated NDC, **Moldova** states that it is working toward achieving sustainable agricultural development for food security, which is not addressed in its previous NDC. **Panama** also situates its updated NDC interventions within commitments to growing its agriculture and livestock sector by addressing finite resources, livelihoods, and long-term food security alongside responses to climate change – co-benefits that were absent from its previous NDC.



A rooftop garden filled with numerous potted plants and several raised beds containing leafy greens. In the background, two tall, modern office buildings with glass facades are visible against a clear sky. The scene is bathed in the warm, golden light of late afternoon or early morning.

5. RECOMMENDATIONS FOR FOOD SYSTEMS TRANSFORMATION

General recommendations for food systems transformation to achieve net zero emissions from food production by 2030 and net negative emissions from food systems by 2050:

- 1. A global shift to nature-positive production:** Nature-positive food production systems protect nature, rely on sustainable and agroecological practices that enhance the richness and abundance of biodiversity in land and water, and rehabilitate the functions of degraded natural systems to deliver a climate-positive future in which people and nature can thrive.
- 2. Reduction in food loss and waste and increase in circularity:** Food loss and waste is a major cause of emissions and over-use of resources and land. There needs to be an increasing emphasis on circularity to reduce emissions and build more resilient and sustainable food systems.
- 3. A transition to healthy and sustainable diets:** A transition to healthy diets produced within planetary boundaries – while respecting the local food context – can reduce GHG emissions, protect and restore wildlife, reduce land-use and prevent premature deaths.
- 4. Collaborate at all levels of the food systems:** A food systems approach to climate change needs to be inclusive and collaborative where all stakeholders are involved in designing and implementing relevant interventions.



5.1. A GLOBAL SHIFT TO NATURE-POSITIVE FOOD PRODUCTION

Nature-positive food production systems protect nature, rely on sustainable and regenerative practices that enhance the richness and abundance of biodiversity in land and water, and rehabilitate the functions of degraded natural systems to deliver a climate-positive future in which people and nature can thrive.^{43,44} Agroecological approaches including organic farming, agroforestry, and regenerative farming have gained prominence as approaches to protect, manage, and restore nature, and hence reduce emissions, while providing healthy food and securing the livelihoods of the people that produce it.⁴⁵

Nature-positive production is meant to protect natural ecosystems against new conversions for food and feed production, to sustainably manage existing food production systems for the benefit of both nature and people, to restore degraded ecosystems, and to rehabilitate soil for sustainable food production.

This requires:

- Transitioning to renewable energy-efficient water use and improved efficiency measures, especially in the production of inputs.⁴⁶
- Investing in digital technology including better weather information, traceability of supply chains and early warning systems for pest and disease outbreak.⁴⁷
- Fostering new business models, market incentives, and regulations for sustainable food supply chain.⁴⁸
- Encouraging a more holistic understanding of agriculture, not only as a system for producing healthy food but also for ensuring healthy soil, biodiversity, clean water, landscape management, and livelihoods for communities.⁴⁹
- Protecting and supporting the recovery of agrobiodiversity, pollinators, and organisms critical for soil fertility and soil health and investing in large scale soil restoration and rehabilitation.⁵⁰
- Promoting nutrition-sensitive agriculture practices to ensure food is produced in adequate quantity and quality in alignment with cultural values while also safeguarding water and other natural resources.⁵¹
- Redirecting finance and repurposing subsidies to support more sustainable land-use practices while investing in production of diverse foods.⁵²

5.2 Reduction in food loss and waste and increase in circularity

Food loss and waste is a major cause of emissions and over-use of resources and land. There needs to be an increasing emphasis on circularity to reduce emissions and build more resilient and sustainable food systems.

A shift to circularity and reducing food loss and waste (FLW) requires:

- Measuring FLW to understand the reasons for FLW, create a case for change, prioritize interventions, track progress, and evaluate impact.⁵³
- Proving that added value can be effectively extracted from FLW⁵⁴ through reuse (e.g., a food-waste-to-feed approach). By fully utilizing and processing large amounts of food waste, it could be possible to decrease demand for commodity corn, soy, and animal/vegetable fat production.⁵⁵
- Adopting voluntary agreements to build a long-term strategy to reduce food waste across industry sectors, regions, or nations.⁵⁶
- Investing in supply chain infrastructure and storage facilities, including equipment and techniques, to reduce post-harvest food loss.⁵⁷
- Supporting short supply chain management (e.g., transport to local markets, urban-rural links, and connection between food producers and consumers).⁵⁸
- Piloting and evaluating behavioural change interventions that reduce consumer food waste generation and developing policy measures and awareness-raising activities based on country-specific research.

5.3 A TRANSITION TO SUSTAINABLE AND HEALTHY DIETS

A transition to healthy diets that can be achieved within planetary boundaries can reduce GHG emissions, protect and restore nature, reduce land-use and prevent premature deaths.⁵⁹

This transition requires:

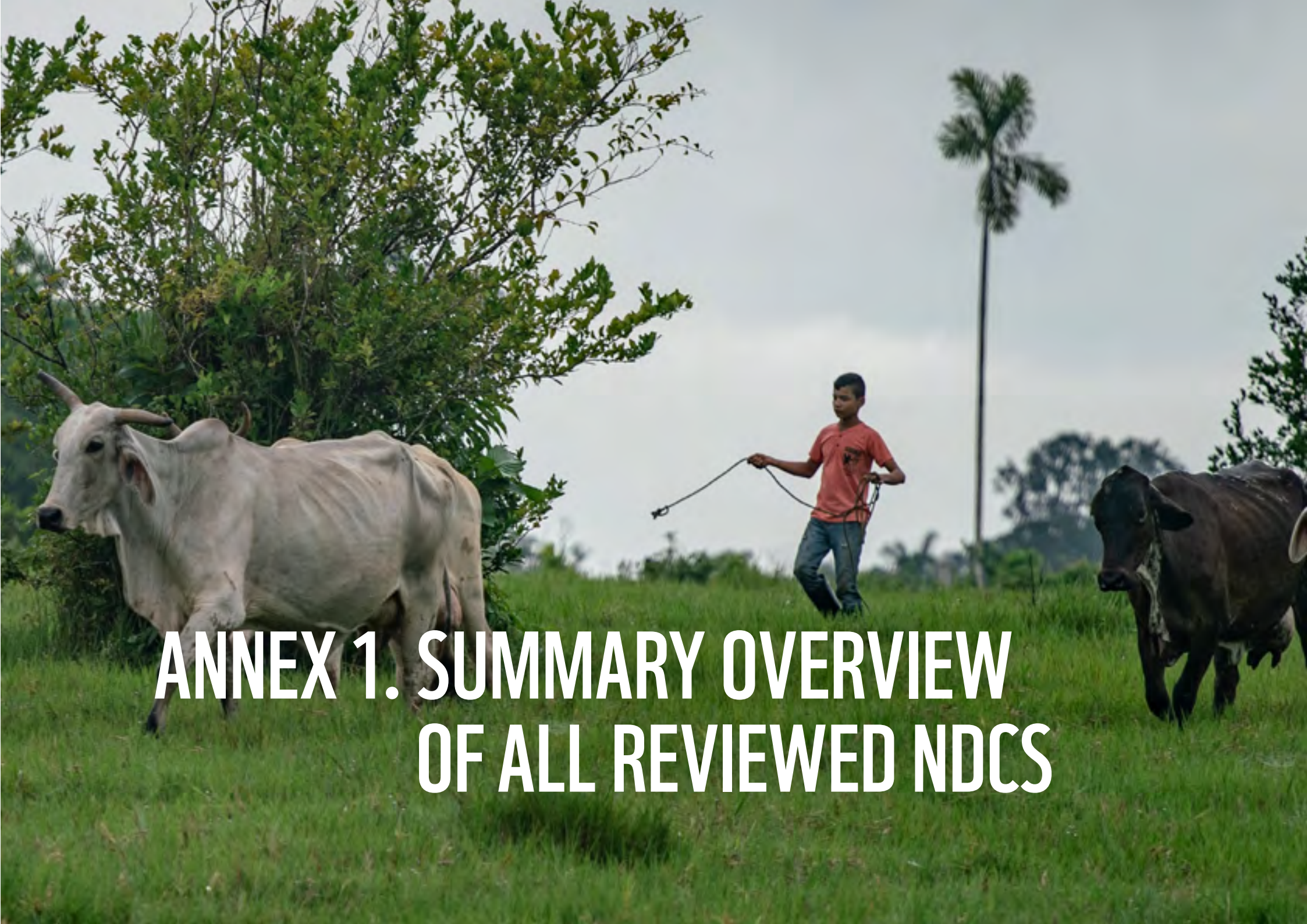
- Understanding and addressing local “food environments” and implementing activities to facilitate consumption of healthy and sustainable foods.
- Increasing food availability, affordability, and access to diverse and nutritious food at local levels, including in public institutions such as schools and hospitals, by adopting sustainable food procurement policies at the national and subnational levels and addressing the true value of food.
- Introducing regulations to incentivize sustainable food choices through lower prices and to disincentivize unhealthy and unsustainable foods through taxation.
- Implementing policy measures and awareness programs to engage and involve consumers to encourage healthy and sustainable diets, including promoting plant-rich diets among populations with consumption levels of animal-sourced foods above dietary recommendations to accelerate health and environmental benefits.

5.4 COLLABORATE AT ALL LEVELS OF THE FOOD SYSTEMS

A food systems approach to climate change needs to be inclusive and collaborative, where all stakeholders are involved in designing and implementing relevant interventions.

This collaboration requires:⁶⁰

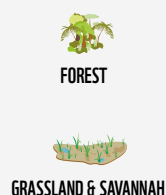
- Identifying food system advocates and building momentum for a change. This will allow policy makers to estimate the level of “buy-in” from governments at different levels of food systems (international, national, and sub-national). Engaging advocates helps to advance awareness-raising activities and training on the food systems approach.
- Defining and introducing good governance principles, inclusiveness, transparency, and accountability in engaging stakeholders to enable dialogue and collaboration across agendas and at multiple levels and priority areas, and to connect different interventions for addressing food system issues.
- Assessing and strengthening institutional capacity and governance at the national level. This can help share knowledge and lessons learned in policy planning, implementation, and governance, and the effectiveness and coherence of these interventions.
- Collaborating with other countries that seek to reduce emissions from food value chains and minimise the use of the most emission intensive products. Given the globalized nature of food systems, emission reductions from food systems requires close cooperation and trust between countries.⁶¹



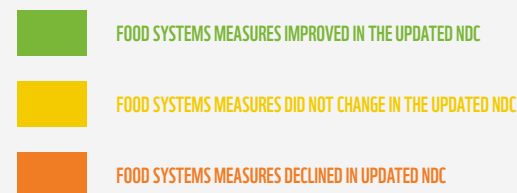
ANNEX 1. SUMMARY OVERVIEW OF ALL REVIEWED NDACS

KEYS

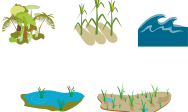
ECOSYSTEMS



STATUS OF INTEGRATION OF FOOD SYSTEMS IN NDC



Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
ALBANIA 	Previous NDC	×	×	×	N/A	×		The updated NDC is detailed and contains descriptions of mitigation and adaptation measures for food systems. Within food systems, most consideration is given to sustainable livestock management, agroforestry and sustainable fisheries management. Climate-smart agriculture is also included in the updated NDC, and that is not present in the previous NDC.
	Updated NDC	✓	✓	✓		×		
ANDORRA 	Previous NDC	×	×	×		×		The updated NDC has a greater emphasis on circular economy, forest and agricultural management, ecosystems, and nature-based measures increasing resiliency.
	Updated NDC	✓	✓	✓		×		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
ANGOLA 	Previous NDC	✓	✓	✓		✗		Both NDCs include agroforestry, sustainable livestock, and sustainable aquaculture and fishing. The updated NDC contains quantitative mitigation goals in the waste sector, addressing organic waste and compost.
	Updated NDC	✓	✓	✓		✓		
ANTIGUA AND BARBUDA 	Previous NDC	✓	✗	✗		✗		No clear quantitative targets or strategies are given in either NDC. In the updated NDC, policies of financing resilience in agriculture and sustainable fishing and aquaculture are included. Both cover the conservation of waterways and consider food security and farmers.
	Updated NDC	✗	✓	✗		✗		
ARGENTINA 	Previous NDC	✓	✓	✗		✗		The updated NDC includes sustainable livestock and sustainable fishing (which are not included in the previous NDC), as well as ecosystem considerations from coastal vulnerabilities and forests to peatlands and grasslands. There is a greater emphasis on adaptation, food security and equity considerations in the updated NDC.
	Updated NDC	✓	✓	✗		✓		
ARMENIA 	Previous NDC	✗	✗	✗		✗		Armenia's first NDC has no reference to food systems. In its updated NDC, Armenia includes agricultural policies, sustainable livestock, waste management policies, and a national forestry programme.
	Updated NDC	✓	✗	✗		✗		

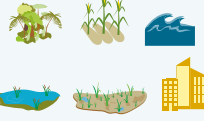
Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
AUSTRALIA 	Previous NDC	✗	✗	✗		✗		In neither the previous nor updated NDC report is there any mention of food systems. Both lack specific targets and specific policy aims for mitigation and adaptation with regard to food systems. The updated NDC does consider food security, livelihoods and indigenous people's topics which were absent from the 2015 document.
	Updated NDC	✗	✗	✗		✓		
BAHRAIN 	Previous NDC	✗	✗	✗		✗		In the updated NDC, there are more ecosystem considerations and fishing considerations than the previous NDC, but food systems are not thoroughly incorporated in either NDC.
	Updated NDC	✗	✓	✗		✗		
BANGLADESH 	Previous NDC	✓	✗	✓		✗		The updated NDC clearly includes mitigation and adaptation agriculture measures. Both NDCs include sustainable livestock. The updated NDC has sustainable fishing & aquaculture, which was not considered in the previous NDC.
	Updated NDC	✓	✓	✓		✗		
BARBADOS 	Previous NDC	✗	✗	✗		✗		The updated NDC has greater detail on conservation; it also includes sustainable fishing and aquaculture, which was not in the previous NDC.
	Updated NDC	✗	✓	✗		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
BELARUS 	Previous NDC	✓	✓	✓		✗		No adaptation measures mentioned in updated NDC and a decrease in quantitative food-system based mitigation measures in the updated NDC.
	Updated NDC	✓	✗	✗		✗		
BELIZE 	Previous NDC	✓	✓	✓		✓		The updated NDC includes agroforestry, climate smart agriculture and plans to reduce post-harvest agricultural food waste and loss as well as mangrove conservation efforts; these measures are not in the previous NDC. Both NDCs include sustainable livestock and sustainable fishing & aquaculture.
	Updated NDC	✓	✓	✓		✓		
BENIN 	Previous NDC	✓	✓	✓		✓		Both NDCs include agroforestry and climate smart agriculture. The updated NDC has greater ecosystem considerations, sustainable fishing & aquaculture, and more specific crop measures, considering cashews and palm oil cultivation in mitigation measures.
	Updated NDC	✓	✓	✓		✓		
BHUTAN 	Previous NDC	✓	✗	✓		✗		Both NDCs cover food systems and the updated NDC has specific targets for forests. Both NDCs include agroforestry, climate smart agriculture, and sustainable livestock.
	Updated NDC	✓	✗	✓		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
BOLIVIA 	Previous NDC	✓	✓	✓		✓		Both NDCs have qualitative and quantitative mitigation and adaptation food systems, considering the same number of ecosystems. Both NDCs include agroforestry, sustainable livestock, sustainable fishing & aquaculture.
	Updated NDC	✓	✓	✓		✓		
BOSNIA AND HERZEGOVINA 	Previous NDC	✗	✗	✗	N/A	✗		No information found on measures related to food systems but the updated NDC does consider ecosystems not previously mentioned.
	Updated NDC	✗	✗	✗		✗		
BRAZIL 	Previous NDC	✓	✗	✓		✓		The previous NDC has sustainable livestock measures which are not present in the updated NDC. However the updated NDC does include more ecosystem considerations as well as agroforestry measures.
	Updated NDC	✓	✓	✗		✓		
BURKINA FASO 	Previous NDC	✓	✓	✓		✗		Both NDCs include agroforestry and sustainable livestock. The previous NDC includes sustainable fishing which is not present in the updated NDC. The updated NDC does include climate smart agriculture, and greater specificity in crop measures and interventions.
	Updated NDC	✓	✓	✓		✓		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
BURUNDI 	Previous NDC	✓	✓	✓		✗		Both NDCs include agroforestry, sustainable livestock, sustainable fishing and aquaculture. While the previous NDC does include agroecology and climate smart agriculture absent in the updated NDC, the updated NDC contains additional and more detailed (numerical) targets agriculture and forestry sector.
	Updated NDC	✓	✓	✓		✓		
CABO VERDE 	Previous NDC	✓	✓	✓		✗		The updated NDC lists several adaptation measures related to food systems and marine and forested areas. While the first NDC contains agroforestry and sustainable fishing, the updated NDC also includes climate smart agriculture, and sustainable livestock. The updated NDC also includes diet plans to promote local fish consumption.
	Updated NDC	✓	✓	✓		✓		
CAMBODIA 	Previous NDC	✓	✓	✓		✓		Both NDCs include sustainable fishing measures. The updated NDC presents similar measures contained in the previous NDC. However, the updated NDC does state plans to reduce rice food loss during and post harvesting, as well as agroecology, agroforestry, climate smart agriculture and sustainable livestock.
	Updated NDC	✓	✓	✓		✓		
CAMEROON 	Previous NDC	✓	✓	✓		✗		The updated NDC presents quite similar measures and targets contained in the previous NDC, but the updated NDC also considers climate smart agriculture and IPLCs. Both NDCs include agroforestry, sustainable livestock and sustainable fishing and aquaculture.
	Updated NDC	✓	✓	✓		✓		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
CANADA 	Previous NDC	✓	✗	✗		✓		The previous NDC includes waste management and ecosystem measures, whereas the updated NDC has mitigation, adaptation, and numerical goals to transform food systems, including climate smart agriculture. The updated NDC also mentions plans to reduce food and organic waste sent to landfills by 2030.
	Updated NDC	✓	✓	✓		✓		
CENTRAL AFRICAN REPUBLIC 	Previous NDC	✓	✓	✓		✓		Both NDCs consider agroecology, agroforestry, and sustainable livestock. The previous NDC includes sustainable fishing and climate smart agriculture which are absent from the updated NDC. In contrast, the updated NDC, measures are specific to individual crops, like coffee and peanuts. There is also greater elaboration of adaptation measures in the updated NDC.
	Updated NDC	✓	✓	✓		✓		
CHAD 	Previous NDC	✓	✓	✗		✗		Both NDCs include agroforestry and sustainable livestock. While the previous NDC does include agroecology and sustainable fishing, the updated NDC has quantitative food system mitigation goals, and considers climate smart agriculture, and IPLCs, demonstrating overall improvement.
	Updated NDC	✓	✓	✓		✓		
CHILE 	Previous NDC	✓	✓	✓		✗		Chile's updated NDC has more specific quantitative measures with the new addition of circular economy and sustainable livestock plans and an expansion on ocean and marine protected areas, which were not mentioned at all in the previous NDC. Both NDCs mention agroforestry.
	Updated NDC	✓	✓	✓		✓		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
CHINA 	Previous NDC	✓	✓	✓		✗		China's updated NDC has more ecosystem considerations, sustainable fishing and aquaculture, measures about fertilizer use, and more quantitative mitigation goals than China's previous NDC. The updated NDC also includes the "empty-plate" campaign to reduce food waste. Both NDCs include sustainable livestock.
	Updated NDC	✓	✓	✓		✗		
COLOMBIA 	Previous NDC	✓	✓	✗		✗		Colombia's updated NDC includes specific food-related mitigation measures by crop, such as coffee and panela, while food mitigation measures are more broad in its previous NDC. The updated NDC has an increase in ecosystem-related measures, focused on mangroves and coasts and considers food security (which are not included in the previous NDC). Both NDCs consider agroforestry and sustainable livestock.
	Updated NDC	✓	✓	✓		✓		
COMOROS 	Previous NDC	✓	✓	✓		✗		Both NDCs are quite similar, including sustainable livestock and agroforestry. The updated NDC considers one more type of ecosystem and climate smart agriculture.
	Updated NDC	✓	✓	✓		✗		
CONGO 	Previous NDC	✓	✓	✓		✗		The previous NDC includes agroecology, agroforestry, sustainable fishing and sustainable livestock. The updated NDC includes agroforestry and climate smart agriculture and has greater specificity on adaptation and a greater focus on smallholder farmers
	Updated NDC	✓	✓	✓		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
COSTA RICA 	Previous NDC	✓	✓	✗		✓		While both Costa Rica's NDCs include agroforestry, the updated NDC includes sustainable livestock, sustainable fishing and aquaculture, quantitative mitigation goals and more ecosystem considerations. The updated NDC also includes plans to create "Adapted Food Guides" to promote the consumption of indigenous and traditional seasonal agricultural products, highlighting their nutritional value while reducing emissions.
	Updated NDC	✓	✓	✓		✓		
CÔTE D'IVOIRE 	Previous NDC	✗	✓	✗		✓		Both NDCs include sustainable livestock and sustainable fishing. The previous NDC includes agroforestry. The updated NDC includes climate smart agriculture, and incorporates food systems into mitigation and adaptation plans, whereas the previous NDC was only adaptation. The updated NDC also states plans to develop storage and preservation units to reduce high post-harvest food losses.
	Updated NDC	✓	✓	✗		✓		
CUBA 	Previous NDC	✓	✓	✓		✗		Food security is considered in Cuba's updated NDC, and it is not in Cuba's previous NDC. Both NDCs include sustainable fishing and aquaculture. The previous NDC includes sustainable livestock which is absent from the updated NDC.
	Updated NDC	✓	✓	✓		✗		
DEMOCRATIC REPUBLIC OF CONGO 	Previous NDC	✓	✓	✓		✓		The updated NDC has expanded quantitative targets in both mitigation and adaptation. Both NDCs include agroecology and sustainable fishing. The updated NDC also considers agroforestry and sustainable livestock.
	Updated NDC	✓	✓	✓		✓		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
DOMINICAN REPUBLIC 	Previous NDC	✗	✓	✗		✓		The updated NDC has more specific quantitative and qualitative food system measures, including agroecology, agroforestry, climate smart agriculture, and sustainable livestock.
	Updated NDC	✓	✓	✓		✓		
DOMINICA 	Previous NDC	✓	✗	✓		✓		The updated NDC has more specific quantitative and qualitative measures, incorporating agroforestry, climate smart agriculture, sustainable livestock, and ecosystem considerations that are absent in the previous NDC. Both NDCs consider IPLCs and sustainable fishing. The updated NDC also does state a goal to reduce agricultural crop loss by 50%.
	Updated NDC	✓	✓	✓		✓		
DPRK 	Previous NDC	✓	✓	✗		✗		The previous NDC lists several waste and agriculture measures including agroforestry and sustainable livestock. The NDC does not list these actions at all but does aim to restore forests.
	Updated NDC	✓	✗	✗		✗		
EGYPT 	Previous NDC	✓	✓	✗		✓		The previous NDC does not have numerical mitigation goals. and the updated NDC does. Both NDCs include sustainable livestock, and the updated NDC expands to include sustainable fishing and aquaculture measures.
	Updated NDC	✓	✓	✓		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
EL SALVADOR 	Previous NDC	✓	✓	✓		✓		Both NDCs have numerical and qualitative food system goals including agroforestry. The updated NDC improves to include agroecology, sustainable livestock, and more ecosystem protection and more crop-specific measures, like sugarcane, corns and beans.
	Updated NDC	✓	✓	✓		✓		
ESWATINI 	Previous NDC	✗	✓	✗		✗		In the updated NDC, food system are included in mitigation plans while previously only in adaptation. Both NDCs include sustainable livestock and climate smart agriculture. The updated NDC includes agroecology, livelihood, food security, and vulnerable groups considerations as well as a diet measure, planning to promote healthy eating in line with adaptation needs.
	Updated NDC	✓	✓	✓		✓		
ETHIOPIA 	Previous NDC	✓	✓	✓		✓		Both NDCs include agroforestry and sustainable livestock . The updated NDC considers climate smart agriculture and more ecosystems than the previous NDC.
	Updated NDC	✓	✓	✓		✓		
EUROPEAN UNION 	Previous NDC	✓	✗	✗		✗		The updated NDC contains a sectoral target for the land use and land use change and forestry as well as wetland and grassland considerations.
	Updated NDC	✓	✗	✗		✓		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
FIJI 	Previous NDC	✗	✓	✗		✗		Both of Fiji's NDCs considers food systems through adaptation. Food systems are not included in either mitigation plan. Updated NDC has specific targets regarding forest and marine ecosystem actions, as well as sustainable livestock and fishing measures, that were not in the previous NDC.
	Updated NDC	✗	✓	✗		✓		
GABON 	Previous NDC	✓	✓	✓		✗		The updated NDC presents numerical targets for forestry and agriculture, however it drops the target for the waste sector that was in the previous NDC. The updated NDC also includes agroforestry.
	Updated NDC	✓	✓	✓		✗		
GAMBIA 	Previous NDC	✓	✓	✓		✓		The updated NDC expands on mitigation and adaptation plans, incorporating climate smart agriculture, agroforestry which are absent from the previous NDC. Both NDCs include sustainable livestock and sustainable fishing. The updated NDC also includes food waste and loss plans through storage, processing, and transportation measures.
	Updated NDC	✓	✓	✓		✓		
GEORGIA 	Previous NDC	✓	✓	✓		✓		The previous NDC only contains forest measures in mitigation and Georgia's updated NDC presents agriculture mitigation measures as well. The updated NDC includes climate smart agriculture.
	Updated NDC	✓	✓	✓		✓		

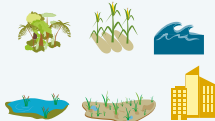
Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
GHANA 	Previous NDC	✓	✓	✓		✓		Both NDCS have numerical and qualitative mitigation and adaptation goals specific to food systems. The previous NDC includes sustainable livestock and climate smart agriculture but the updated NDC considers more ecosystem protection.
	Updated NDC	✓	✓	✓		✓		
GRENADA 	Previous NDC	✓	✗	✗		✗		The updated NDC has minimal detail of the adaptation and mitigation measures. The previous NDC contains a description of ecosystem protection actions that are absent in the Updated NDC.
	Updated NDC	✗	✗	✗		✗		
GUATEMALA 	Previous NDC	✓	✓	✓		✓		The Updated NDC contains sustainable livestock, sustainable fishing and agroforestry. Out of these measures, only agroforestry was included previously.
	Updated NDC	✓	✓	✓		✓		
GUINEA 	Previous NDC	✓	✓	✓		✓		The previous NDC considers agroecology. The updated NDC includes this as well, while also incorporating agroforestry, sustainable livestock and sustainable fishing. The updated NDC has more quantitative goals and more adaptation measures, compared to the previous NDC.
	Updated NDC	✓	✓	✓		✓		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
GUINEA-BISSAU 	Previous NDC	✓	✓	✗		✗		Both NDCs include agroforestry. The updated NDC expands to include climate smart agriculture, sustainable livestock, and crop-specific measures, specifically considering cashews, mangroves, and rice, that are absent in the previous NDC. The updated NDC also aims to divert food waste.
	Updated NDC	✓	✓	✓		✗		
HAITI 	Previous NDC	✓	✓	✗		✗		Both NDCs have a comprehensive overview of agriculture and ecosystem-related measures, including agroforestry. The updated NDC has numerical mitigation targets related to agriculture and includes sustainable livestock. The previous NDC includes sustainable fishing which is not included in the updated NDC.
	Updated NDC	✓	✓	✓		✗		
HONDURAS 	Previous NDC	✓	✓	✓		✓		Both have numerical agriculture mitigation goals and consider agroforestry and other ecosystem measures. The previous NDC includes agroecology and sustainable livestock which is absent in the updated NDC.
	Updated NDC	✓	✓	✓		✓		
ICELAND 	Previous NDC	✗	✗	✗		✗		In both NDCs, there are no mentions of actions related to food systems or ecosystem protection. In the updated NDC, however, there are more ecosystems considered.
	Updated NDC	✗	✗	✗		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
INDIA 	Previous NDC	✓	✓	✓		✓		The updated NDC does not include several of the food-system mitigation and adaptation measures that are present in the previous NDC, including agroforestry, sustainable livestock and sustainable fishing.
	Updated NDC	✓	✗	✗		✗		
INDONESIA 	Previous NDC	✓	✓	✓		✓		Both NDCs have numerical and qualitative mitigation goals and adaptation goals specific to food systems. The updated NDC does specifically include sustainable livestock.
	Updated NDC	✓	✓	✓		✓		
ISRAEL 	Previous NDC	✗	✗	✗	N/A	✗		The previous NDC has no food system considerations. The updated NDC has detailed waste mitigation targets.
	Updated NDC	✓	✗	✓	N/A	✗		
JAMAICA 	Previous NDC	✗	✗	✗		✗		The updated NDC includes land use and agroforestry measures that are absent in the previous NDC.
	Updated NDC	✓	✓	✓		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
JAPAN 	Previous NDC	✓	✓	✓		✗		The previous NDC contains specific targets for food systems targeting sustainable livestock, crop land, waste management. While the updated NDC does not have these targets, it does include sustainable fishing and mentions a separate document “Strategy for Sustainable Food Systems”, the material from which is not explicitly included in the NDC report.
	Updated NDC	✓	✓	✗		✗		
JORDAN 	Previous NDC	✓	✓	✓		✗		While the previous NDC contains agriculture measures, the updated NDC explicitly includes climate smart agriculture and sustainable livestock.
	Updated NDC	✓	✓	✓		✓		
KENYA 	Previous NDC	✓	✓	✗		✓		Both NDCs include climate smart agriculture, sustainable livestock and sustainable fishing. The updated NDC has measures targeting specific crops: mangrove, seaweed, etc. that are not in the previous NDC as well as agroforestry plans.
	Updated NDC	✓	✓	✓		✓		
KUWAIT 	Previous NDC	✗	✓	✗		✗		Both previous NDC and updated NDC do not list specific mitigation measures for food systems. There are mentions of food security in both NDCs. The updated NDC includes sustainable fishing, absent from the previous NDC.
	Updated NDC	✗	✓	✗		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
KYRGYZSTAN 	Previous NDC	✗	✗	✗	N/A	✗		Kyrgyzstan's previous NDC does not mention any food system measure. The updated NDC includes agroforestry, climate smart agriculture and sustainable livestock.
	Updated NDC	✓	✓	✓		✗		
LAO PDR 	Previous NDC	✓	✓	✓		✓		Lao's previous NDC provides a numeric mitigation target for forestry. The updated NDC considers targets for agriculture and waste, and considers climate smart agricultures. These issues are not mentioned in the previous NDC. The previous NDC considers food security and agroforestry, while the updated NDC does not.
	Updated NDC	✓	✓	✓		✓		
LEBANON 	Previous NDC	✗	✓	✗		✗		Compared to the previous NDC, Lebanon's updated NDC includes more food system and ecosystem conservation and restoration measures.
	Updated NDC	✗	✓	✗		✗		
LIBERIA 	Previous NDC	✓	✓	✓		✓		Both NDCs include agroforestry, climate smart agriculture, sustainable livestock, and sustainable fishing. The updated NDC also includes measures to address food waste and plans to develop national dietary guidelines to support climate-resilient, food secure livelihoods.
	Updated NDC	✓	✓	✓		✓		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
MALAWI 	Previous NDC	✓	✓	✓		✓		Both NDCs include agroforestry, climate smart agriculture, sustainable livestock, and sustainable fishing. The updated NDC has more specific ecosystem considerations. The updated NDC also aims to promote post-harvest storage and preservation measures to reduce food waste and loss. In terms of diet measures, the updated NDC plans to promote resilient diets for smallholder farmer and train households in food budgeting, utilisation & preservation.
	Updated NDC	✓	✓	✓		✓		
MALAYSIA 	Previous NDC	✗	✓	✗		✗		In both NDCs there is a focus on restoration and conservation of coastal areas and food security. Ecosystem protection is given more consideration in the updated NDC.
	Updated NDC	✗	✓	✗		✗		
MALDIVES 	Previous NDC	✗	✗	✗		✗		Maldives stress in both NDCs their limited scope for mitigation, particularly in agriculture given that they import a majority of their food. Both emphasize food security strategies and the updated NDC does include climate smart agriculture which is absent from the previous NDC.
	Updated NDC	✗	✓	✗		✗		
MALI 	Previous NDC	✓	✓	✓		✗		Both NDCs include climate smart agriculture and sustainable livestock. The updated NDC improves to include sustainable fishing and agroforestry as well.
	Updated NDC	✓	✓	✓		✗		

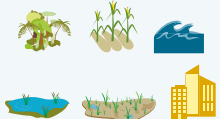
Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
MARSHALL ISLANDS 	Previous NDC	✓	✓	✗		✗		The previous NDC mentions landfills for mitigation and agriculture for adaptation. The updated NDC does not contain any reference to food systems.
	Updated NDC	✗	✗	✗	N/A	✗		
MAURITANIA 	Previous NDC	✓	✓	✓		✗		Both NDCs include sustainable fishing. The updated NDC expands to include agroecology, agroforestry, and sustainable livestock, but both NDCs have quantitative and qualitative mitigation and adaptation food system measures.
	Updated NDC	✓	✓	✓		✗		
MAURITIUS 	Previous NDC	✓	✓	✗		✗		Both NDCs include climate smart agriculture and sustainable fishing. The updated NDC expands on food measures to include agroecology, agroforestry, and sustainable livestock, measures that are not in the previous NDC.
	Updated NDC	✓	✓	✓		✓		
MEXICO 	Previous NDC	✓	✓	✗		✓		There is not a quantitative mitigation food measure in either of the NDCs. Both NDCs include sustainable livestock. The updated NDC improves to include agroecology, agroforestry and sustainable fishing.
	Updated NDC	✓	✓	✗		✓		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
MOLDOVA 	Previous NDC	✓	✓	✓		✗		The previous NDC considers sustainable livestock and sustainable fishing. These measures were not mentioned in the updated NDC. The updated NDC does include agroecology, agroforestry, and climate smart agriculture.
	Updated NDC	✓	✓	✗		✗		
MONACO 	Previous NDC	✗	✗	✗	N/A	✗		Both NDCs do not contain any adaptation measures related to food systems. General considerations of the waste sector, in particular, are present in the updated NDC.
	Updated NDC	✓	✗	✗		✗		
MONGOLIA 	Previous NDC	✓	✓	✓		✗		Both NDCs consider sustainable livestock measures, and agriculture adaptation. Both NDCs are very similar, with ecosystem conservation and preservation. The updated NDC does not have a numerical food-system mitigation goal though.
	Updated NDC	✓	✓	✗		✗		
MONTENEGRO 	Previous NDC	✗	✗	✗	N/A	✗		The previous NDC makes no reference to any food systems. The updated NDC has waste management measures as well as soil degradation and forestry measures that were not present previously.
	Updated NDC	✓	✓	✓		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
MOROCCO 	Previous NDC	✓	✓	✓		✓		Both NDCs include sustainable fishing. The previous NDC also includes agroforestry which is absent in the updated NDC. The updated NDC does not consider IPLCs.
	Updated NDC	✓	✓	✓		✗		
MOZAMBIQUE 	Previous NDC	✓	✓	✗		✓		Both NDCs include sustainable livestock and fishing. The updated NDC expands to include agroforestry and climate smart agriculture. The updated NDC also aims to reduce post-harvest food waste and loss.
	Updated NDC	✓	✓	✗		✓		
MYANMAR 	Previous NDC	✓	✓	✓		✗		Both of Myanmar's NDCs contain agroforestry, climate smart agriculture, sustainable livestock, and waste management. The updated NDC contains sustainable fishing too.
	Updated NDC	✓	✓	✓		✗		
NAMIBIA 	Previous NDC	✓	✓	✓		✓		Both NDCs include agroforestry, climate smart agriculture and sustainable livestock measures. The updated NDC has an increased focus on coastal agriculture and developing the blue economy, which is not in the previous NDC. There are increased linkages between forestry and food security in the updated NDC. The updated NDC also aims to encourage innovations in post-harvest measures to reduce food waste and loss.
	Updated NDC	✓	✓	✓		✓		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
NAURU 	Previous NDC	✗	✗	✗		✗		Nauru's previous NDC contains no information relating to food systems. The updated NDC includes agroforestry, sustainable fishing, waste management, and food security considerations.
	Updated NDC	✓	✓	✗		✗		
NEPAL 	Previous NDC	✓	✗	✗		✓		The updated NDC has numerical and ecosystem-related targets and it strengthens the considerations of indigenous people. The updated NDC also includes agroforestry, climate smart agriculture and sustainable livestock that are not in the previous NDC. Adaptation actions are lacking in both previous NDC and updated NDC.
	Updated NDC	✓	✗	✓		✓		
NEW ZEALAND 	Previous NDC	✗	✗	✗		✗		Both of New Zealand's NDCs give very little detail on mitigation or adaptation approaches. In the updated NDC agricultural measures are considered with reference to indigenous people's pastoral methods.
	Updated NDC	✓	✗	✗		✓		
NICARAGUA 	Previous NDC	✓	✓	✓		✓		Both NDCs include agroecology, agroforestry, sustainable livestock, and have numerical food-system mitigation measures. The updated NDC considers more ecosystem protections.
	Updated NDC	✓	✓	✓		✓		

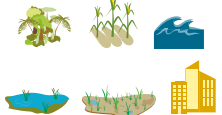
Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
NIGER 	Previous NDC	✓	✓	✓		✓		Both NDCs include agroforestry, climate smart agriculture, and sustainable livestock. The updated NDC expands on existing measures with detailed agriculture and livestock measures.
	Updated NDC	✓	✓	✓		✓		
NIGERIA 	Previous NDC	✓	✓	✓		✗		The previous NDC includes agroforestry, climate smart agriculture, and sustainable livestock and sustainable fishing. The updated NDC does not include sustainable livestock nor sustainable fishing measures, nor does it include IPLC considerations.
	Updated NDC	✓	✓	✓		✗		
NORTH MACEDONIA 	Previous NDC	✗	✗	✗	N/A	✗		The previous NDC contains no reference to food systems. The updated NDC considers agriculture, LULUCF generally and waste management. Neither NDC mentions conservation, IPLCs or sustainable livelihoods.
	Updated NDC	✓	✓	✓		✗		
NORWAY 	Previous NDC	✗	✗	✗		✗		Norway does not include food-system specific policy or targets in either NDC but does consider ecosystems and IPLCs in its updated NDC.
	Updated NDC	✗	✗	✗		✓		

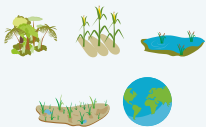
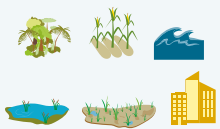
Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
OMAN 	Previous NDC	✓	✓	✗		✗		Oman's previous NDC mentions mitigation from solid waste and adaptation in agriculture. The updated NDC considers food security adaptation measures but does not include food systems elsewhere. Both NDCs include sustainable fishing measures.
	Updated NDC	✗	✓	✗		✗		
PAKISTAN 	Previous NDC	✓	✓	✗		✗		Both NDCs include agroforestry, climate smart agriculture, and sustainable livestock. The updated NDC contains more detailed agricultural and forestry measures than the previous NDC. The updated NDC has more ecosystem considerations than the previous NDC.
	Updated NDC	✓	✓	✓		✓		
PANAMA 	Previous NDC	✓	✗	✓		✓		Both NDCs include agroforestry and sustainable livestock measures. The updated NDC includes mangroves and more ecosystem considerations than the previous NDC.
	Updated NDC	✓	✓	✓		✓		
PAPUA NEW GUINEA 	Previous NDC	✓	✗	✗		✗		The updated NDC contains numerical mitigation targets whereas the previous NDC does not. The updated NDC includes agroforestry, climate smart agriculture and greater detail on conservation, focusing on coral reef and mangrove protection – measures that are not in the previous NDC.
	Updated NDC	✓	✓	✓		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
PARAGUAY 	Previous NDC	✓	✓	✗		✗		The updated NDC has a numerical mitigation target and the previous NDC does not. The updated NDC also considers agroecology, agroforestry, and sustainable livestock.
	Updated NDC	✓	✓	✓		✓		
PERU 	Previous NDC	✗	✓	✗		✓		The previous NDC includes sustainable fishing, which is not present in the updated NDC. No clear food-system measures in either NDC despite brief adaptation measures mentioned in the previous NDC.
	Updated NDC	✗	✗	✗		✗		
QATAR 	Previous NDC	✗	✗	✗	N/A	✗		In the previous NDC, there is no mention of food systems. In the updated NDC, agricultural techniques, conservation and food security, are considered.
	Updated NDC	✓	✗	✓	N/A	✗		
REPUBLIC OF KOREA 	Previous NDC	✗	✗	✗	N/A	✗		The updated NDC considers agriculture, waste, sustainable livestock and sustainable fishing practices where the previous NDC mentions none of these.
	Updated NDC	✓	✓	✗		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
RWANDA 	Previous NDC	✓	✓	✓		✗		Both NDCs include agroforestry and sustainable livestock measures. The previous NDC includes agroecology which is not in the updated NDC. The updated NDC also aims to reduce post-harvest food waste and loss and improve the agricultural value chain.
	Updated NDC	✓	✓	✓		✗		
SAINT KITTS AND NEVIS 	Previous NDC	✗	✗	✗	N/A	✗		The previous NDC does not cover food systems. The updated NDC includes climate smart agriculture and sustainable fishing and aquacultures, measures which are not included previously.
	Updated NDC	✗	✓	✗		✓		
SAINT LUCIA 	Previous NDC	✓	✗	✗		✗		Saint Lucia's previous NDC does not have broad food system incorporation, despite agroforestry considerations. The updated NDC includes more detail on agricultural approaches, forestry, conservation, food security considerations.
	Updated NDC	✗	✓	✗		✗		
SAMOA 	Previous NDC	✓	✓	✗		✗		Samoa's previous NDC cites a national adaptation plan separate from the NDC. The updated NDC contains significant detail on food systems with clear agroforestry and waste targets.
	Updated NDC	✓	✓	✓		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
SAO TOME AND PRINCIPE 	Previous NDC	✗	✓	✗		✗		Adaptation actions for the food system are mentioned in both NDCs. The updated NDC includes sustainable fishing and sustainable livestock practices.
	Updated NDC	✓	✓	✗		✗		
SAUDI ARABIA 	Previous NDC	✗	✓	✗		✗		Sustainable agriculture is barely mentioned in previous NDC. The updated NDC discusses agricultural techniques to improve efficiency and ecosystem conservation and restoration strategies to prevent desertification.
	Updated NDC	✓	✗	✗		✗		
SERBIA 	Previous NDC	✗	✗	✗		✗		The previous NDC does not include food system measures. The updated NDC does state numerical food-system mitigation targets and includes sustainable livestock targets.
	Updated NDC	✓	✓	✓		✗		
SEYCHELLES 	Previous NDC	✓	✓	✗		✓		Both NDCs include climate smart agriculture, and sustainable fishing practices. The updated NDC expands to include sustainable livestock and agroforestry measures. There is also a greater focus on food security and the Blue Economy in the updated NDC.
	Updated NDC	✓	✓	✗		✓		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
SIERRA LEONE 	Previous NDC	✓	✓	✗		✗		Both NDCs include climate smart agriculture, sustainable livestock and sustainable fishing practices. The updated NDC improves to include agroforestry, food security considerations, and more ecosystem conservation and restoration. The updated NDC also includes plans to reduce post-harvest food waste and loss and improve value chains.
	Updated NDC	✓	✓	✓		✓		
SINGAPORE 	Previous NDC	✗	✗	✗		✗		The only mention of food systems is in the updated NDC which discusses localizing food production and increasing local production from 10% to 30% of total national consumption.
	Updated NDC	✓	✗	✓		✗		
SOLOMON ISLANDS 	Previous NDC	✗	✓	✗		✗		While the agriculture and forestry sectors are mentioned in both NDCs, specific actions and measures are limited. In the updated NDC, there is an improved focus on forestry and ecosystems.
	Updated NDC	✓	✗	✗		✗		
SOMALIA 	Previous NDC	✗	✓	✗		✓		Both NDCs include agroforestry. The updated NDC expands to include climate smart agriculture, sustainable fishing and sustainable livestock practices, which is absent in the previous NDC. The previous NDC does not mention any mitigation strategies related to food systems, while the updated NDC does.
	Updated NDC	✓	✓	✓		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
SOUTH AFRICA 	Previous NDC	✗	✗	✗		✗		In the previous NDC, there is no mention of food systems. The updated NDC highlights agricultural measures in adaptation and includes climate smart agriculture.
	Updated NDC	✗	✓	✗		✓		
SOUTH SUDAN 	Previous NDC	✓	✓	✓		✓		Both NDCs include agroforestry, climate smart agriculture, and sustainable livestock practices. The updated NDC improves from the previous NDC, adding detail, an emphasis on food-related livelihood diversification plans for vulnerable communities and incorporating sustainable fishing. The updated NDC also considers post-harvest measures including cold storage to reduce food loss and waste.
	Updated NDC	✓	✓	✓		✓		
SRI LANKA 	Previous NDC	✓	✓	✓		✓		Both NDCs include climate smart agriculture, sustainable livestock and sustainable fishing measures. The updated NDC considers more ecosystem considerations, agroforestry and plans to reduce food waste and loss, especially with fruits and vegetables through better post-harvest management.
	Updated NDC	✓	✓	✓		✓		
STATE OF PALESTINE 	Previous NDC	✓	✓	✓		✗		Both NDCs include agroforestry and climate smart agriculture. The updated NDC contains more detailed numerical mitigation targets, and incorporates sustainable livestock and fishing measures that are absent previously.
	Updated NDC	✓	✓	✓		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
SUDAN 	Previous NDC	✓	✓	✓		✗		Both NDCs include sustainable livestock. The previous NDC includes agroforestry which is not in the updated NDC. Both NDCs include food-system quantitative mitigation targets.
	Updated NDC	✓	✓	✓		✗		
SURINAME 	Previous NDC	✓	✓	✓		✓		The updated NDC has an increased focus on agriculture-related adaptation measures, agroforestry, and more ecosystem considerations than the previous NDC. The updated NDC also considers food security and livelihood diversification.
	Updated NDC	✓	✓	✓		✓		
SWITZERLAND 	Previous NDC	✗	✗	✗		✗		No relevant measure for either NDC. The updated NDC did consider more ecosystems though compared to the previous NDC.
	Updated NDC	✗	✗	✗		✗		
TAJIKISTAN 	Previous NDC	✗	✓	✗		✗		The updated NDC includes agroforestry, climate smart agriculture, and sustainable livestock measures. These specific measures are absent in the previous NDC.
	Updated NDC	✓	✓	✗		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
TANZANIA 	Previous NDC	✓	✓	✗		✗		Both NDCs include climate smart agriculture and sustainable livestock practices. The updated NDC does include sustainable fishing, which is not in the previous NDC. No quantitative food-systems mitigation target is in either NDC.
	Updated NDC	✓	✓	✗		✗		
THAILAND 	Previous NDC	✗	✓	✗		✗		Both NDCs only refer to food systems in adaptation measures. The updated NDC does refer to food security where the previous NDC does not, but the updated NDC has less ecosystem considerations.
	Updated NDC	✗	✓	✗		✗		
TOGO 	Previous NDC	✓	✓	✗		✗		Both NDCs include agroforestry and sustainable livestock. The updated NDC improves by using a numerical mitigation target for the forestry and land use sector that the previous NDC does not state.
	Updated NDC	✓	✓	✓		✓		
TONGA 	Previous NDC	✓	✓	✗		✗		Both NDCs include agroforestry and ecosystem conservation measures. The updated NDC also includes sustainable fishing practices and food security considerations.
	Updated NDC	✓	✓	✓		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
TUNISIA 	Previous NDC	✓	✓	✗		✗		The updated NDC expands on the previous NDC, paying attention to food resilience. Moreover, the updated NDC gives numerical target for actions in the waste sector. Both NDCs include sustainable livestock practices.
	Updated NDC	✓	✓	✗		✗		
UGANDA 	Previous NDC	✓	✓	✗		✗		Both NDCs include agroforestry, climate smart agriculture, and sustainable livestock practices. Uganda's 2022 updated NDC has food-system quantitative mitigation measures. The updated NDC also includes goals to reduce post-harvest food loss through expanding post-harvest handling, storage, and improving agricultural value chains and marketing.
	Updated NDC	✓	✓	✓		✓		
UKRAINE 	Previous NDC	✗	✗	✗	N/A	✗		Neither of Ukraine's NDCs contain reference to any food system measures. The updated NDC considers more ecosystems.
	Updated NDC	✗	✗	✗		✗		
UNITED ARAB EMIRATES 	Previous NDC	✓	✓	✓		✗		While both NDCs mention climate smart agriculture and food waste prevention, the updated NDC has a greater emphasis on food loss/waste reduction, incorporating more stakeholders. Further, the updated NDC also has a greater focus on ecosystem conservation and restoration than the previous NDC.
	Updated NDC	✓	✓	✓		✗		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
UNITED KINGDOM 	Previous NDC	✗	✓	✗		✗		The previous NDC refers to changes in diets and sustainable food systems. The updated NDC does not include diet measures but does still include food waste loss reductions and considers more ecosystems.
	Updated NDC	✓	✓	✗		✗		
UNITED STATES 	Previous NDC	✗	✗	✗	N/A	✗		The previous NDC does not reference the food systems. In the updated NDC, climate smart agriculture and sustainable livestock is included. There are no numerical mitigation food-system measures in either NDC.
	Updated NDC	✓	✓	✗		✗		
UZBEKISTAN 	Previous NDC	✗	✓	✗		✓		The updated NDC presents a more detailed adaptation measures and numerical food-system mitigation targets that are not present in the previous NDC. Both NDCs include sustainable livestock measures.
	Updated NDC	✓	✓	✓		✓		
VANUATU 	Previous NDC	✓	✓	✗		✓		Both NDCs consider sustainable livestock, agriculture and waste measures. The updated NDC adds to this by incorporating numerical mitigation targets for food systems, including agroforestry, climate smart agriculture, and sustainable fishing, and post-harvest measures to reduce agriculture food waste.
	Updated NDC	✓	✓	✓		✓		

Country	NDC version	Food Systems in Mitigation	Food Systems in Adaptation	Numerical mitigation targets for food systems	Ecosystems mentioned	Role of IP/LC mentioned	Status of integration of food in NDC	Summary assessment findings
VENEZUELA 	Previous NDC	✓	✓	✓		✓		Both NDCs include agroecology and agroforestry. The updated NDC has an emphasis on increasing the sustainability of cacao, reducing agro-chemical fertilizer input use, increased forestry management, and sustainable livestock practices.
	Updated NDC	✓	✓	✓		✓		
VIET NAM 	Previous NDC	✓	✓	✓		✓		Both NDCs include sustainable livestock measures. The updated NDC has agricultural sector mitigation and adaptation goals, including agroforestry and climate smart agriculture. Both NDCs consider IPLCs.
	Updated NDC	✓	✓	✓		✓		
ZAMBIA 	Previous NDC	✓	✓	✗		✗		Both NDCs include climate smart agriculture and sustainable livestock and fishing measures. No numerical mitigation actions related to food systems are mentioned in the NDCs. The updated NDC includes IPLC considerations and the previous NDC does not.
	Updated NDC	✓	✓	✗		✓		
ZIMBABWE 	Previous NDC	✗	✓	✗		✓		Both NDCs include agroforestry, climate smart agriculture and sustainable livestock measures. The updated NDC improves by including agroecology and numerical mitigation measures.
	Updated NDC	✓	✓	✓		✓		

ANNEX 2. METHODOLOGY

For this paper, reviewers from Climate Focus reviewed the previous and updated NDCs of 134 Parties (including the European Union) that submitted an updated NDC to the United Nations Framework Convention on Climate Change (UNFCCC) as of September 30, 2022, to determine if and to what extent food systems are incorporated in these climate plans. The review and analysis involved three steps:

1. **Gathering qualitative information from each NDC.** Reviewers created an assessment framework to identify information related to food systems throughout each NDC using a keyword search as follows:
 - a. In each NDC, researchers searched for the following keywords to identify relevant mitigation targets and measures for food systems: *“climate-smart agriculture, sustainable livestock, agroecology, regenerative agriculture, sustainable agriculture, sustainable aquaculture, sustainable fishing, sustainable land management, sustainable forest management, and agro-pastoral systems, conservation agriculture, precision agriculture, food waste, food loss, and sustainable diets, nature-based solutions, organic waste, composting, circularity, circular systems, waste mitigation, waste prevention, food system, municipal solid waste (MSW), landfill, methane, land use and land use change and forestry (LULUCF).”*
 - b. Reviewers copied relevant text and repeated this process using the same keywords to find qualitative measures and instruments for mitigation and adaptation actions, specifically examining if measures are quantitatively grounded.
 - c. Reviewers also gathered information on equity considerations, like inclusion of Indigenous Peoples and Local Communities (IPLCs), smallholder farmers, whether food security is considered, and how many ecosystems are mentioned in each NDC.
 - d. Then, reviewers identified what ecosystems are considered in the NDC, using these keywords: forests, oceans, marine, coastal, rivers, savannahs, peatlands, grasslands, rangelands, and mangroves.



Note: Some Parties, like Bolivia, have measures that explicitly state they are joint mitigation and adaptation measures. NDC Reviewers thus counted these measures under both categories. In circumstances where there are more than 2 NDCs, like the Republic of Korea or Argentina, researchers reviewed the most recent and complete NDCs.

2. **Assessing the quality of food systems measures in NDCs:** Researchers then developed an analysis framework to gauge the degree and scope of food systems measures within all updated NDCs and compare this with the previous versions of these NDCs.
3. **Identifying trends and gaps:** Researchers compared the NDCs of each Party to each other, examining whether these solutions include numerical targets and whether their co-benefits were explicitly highlighted.

ANNEX 3. GLOSSARY

Term	Definition
Agroecology	Agroecology is a holistic and integrated approach that applies ecological and social principles to the design and management of sustainable agriculture and food systems. It seeks to optimize the interactions between plants, animals, humans and the environment while addressing the need for socially equitable food systems. ⁶² Agroecology practices include crop diversification, resilience, circular economy, responsible governance, sustainable land management
Agroforestry	Agroforestry includes both traditional and modern land-use systems where trees are managed with crops and/or animal production systems in inter-connected agricultural settings. Agroforestry systems are dynamic, ecologically based, natural resource management systems that diversify and sustain production to increase social, economic, and environmental benefits for land users. ⁶³
Climate-Smart Agriculture	Climate-Smart Agriculture (CSA) is agricultural systems management approach that has three objectives: sustainably increasing productivity and incomes, adapting to climate change, and reducing greenhouse gas emissions.⁶⁴ Every climate-smart agricultural practice does not necessarily meet all three goals. Climate-smart practices include the management of farms, crops, livestock, aquaculture and capture fisheries to manage resources better and to produce more with less while increasing resilience, ecosystem management to conserve ecosystem services and services and technologies for farmers to enable them to implement the necessary changes.⁶⁵
Food system	The food system includes all elements (environment, people, inputs, processes, infrastructures, institutions) and activities that relate to the production, processing, distribution, preparation and consumption of food and their socioeconomic and environmental impacts. ⁶⁶
Just Transition	A just transition involves maximizing the social and economic opportunities of climate action while minimizing and managing any challenges related to the impacts on livelihood and community wellbeing, including gendered impacts, to facilitate decent work outcomes, ensuring respect for international labour standards in the process. ⁶⁷
Post-harvest	Post-harvest refers to all the measures after cultivation or production, as a food system also includes the storage, distribution, processing (including any sterilization), transportation, storage, and distribution from a local, regional, and national level. ⁶⁸
Circular Economy	Specifically, for food systems, circular economy implementation, means a food system that does not create waste, either by redistributing surplus edible food to those who need it, advancing post-harvest measures to prolong the edible lifespan of food and by re-purposing inedible food by-products and human waste as inputs for new products. ⁶⁹

ENDNOTES

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to build a future in which humans live in harmony with nature.



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