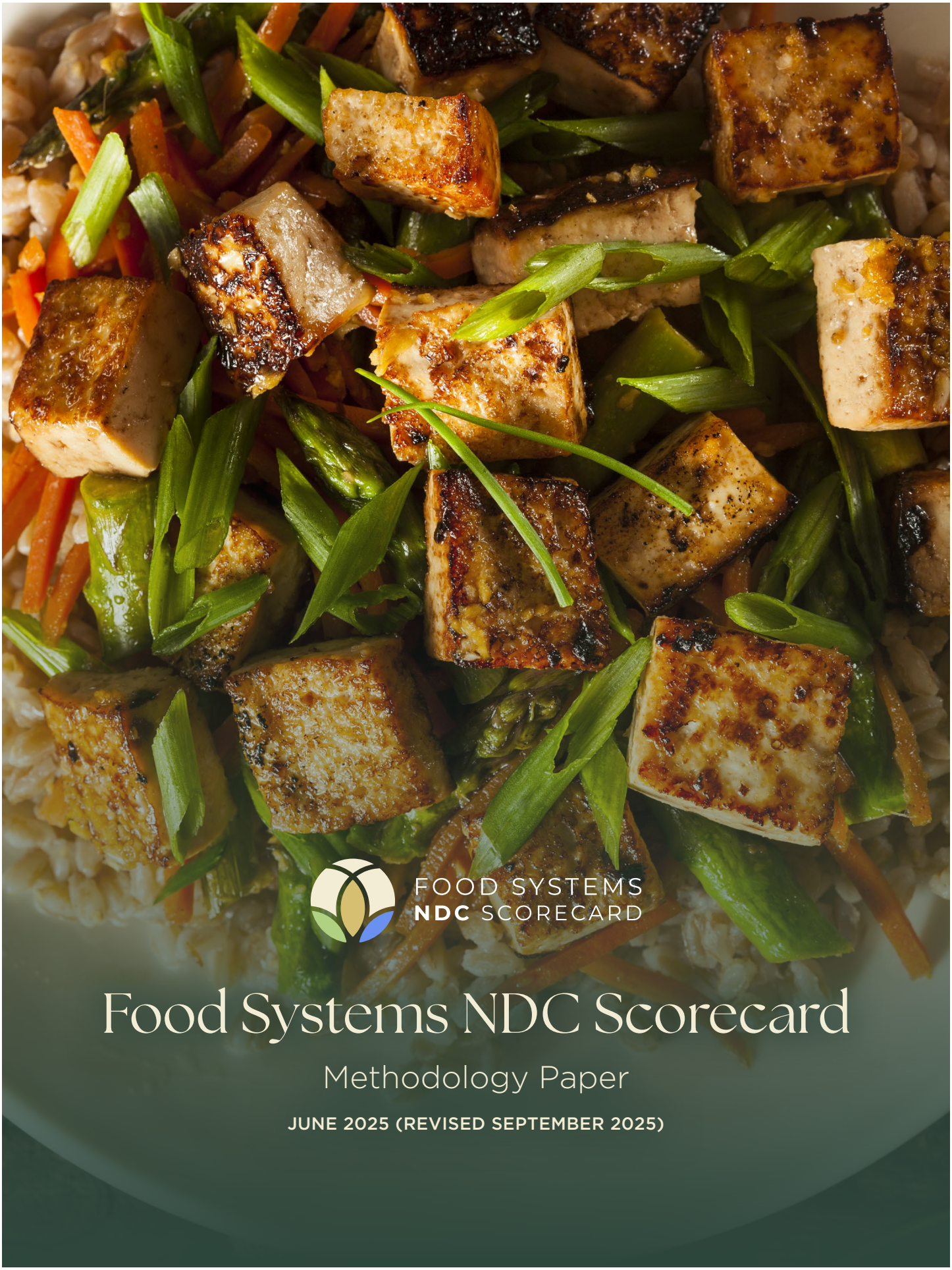


FOOD SYSTEMS
NDC SCORECARD

Food Systems NDC Scorecard

Methodology Paper

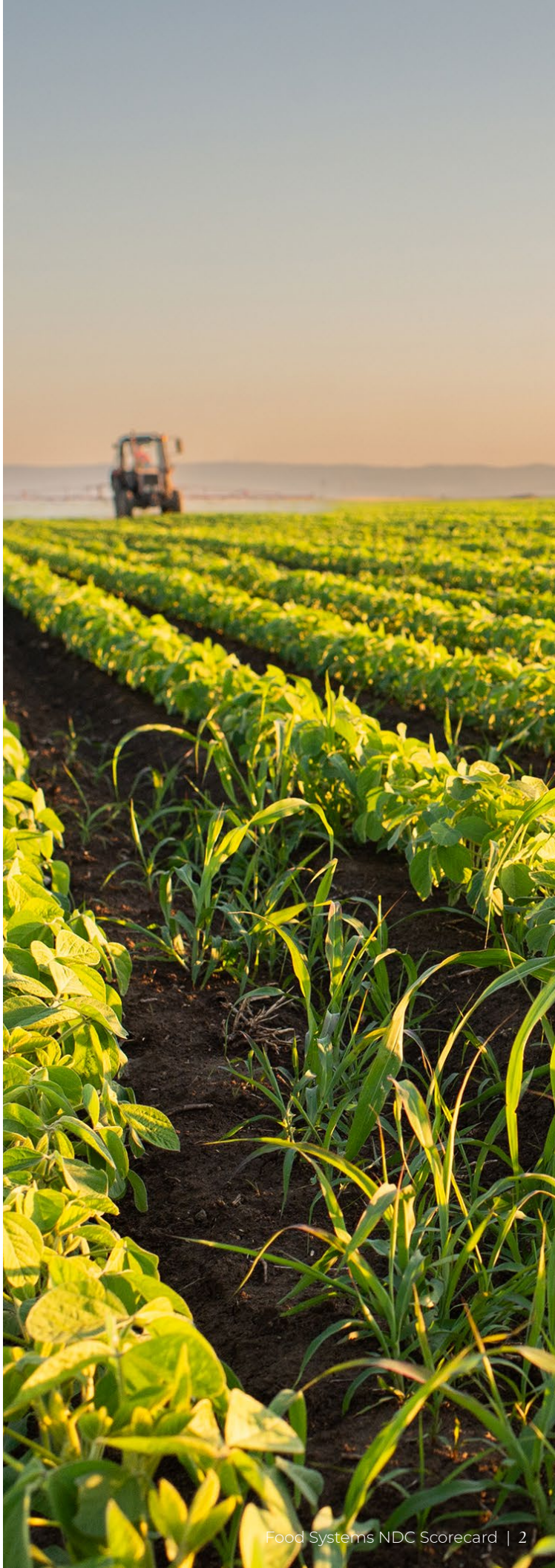
JUNE 2025 (REVISED SEPTEMBER 2025)

I. Introduction

Food systems reform plays a critical role in achieving global climate goals, with the sector contributing approximately one-third of anthropogenic greenhouse gas (GHG) emissions and increasingly impacted by climate change (IPCC 2019). Even if fossil fuel emissions ceased immediately, emissions from food systems alone could drive global temperatures beyond the 1.5°C target and make the 2°C goal of the Paris Agreement difficult to achieve (Clark et al. 2020). While food systems must urgently reduce their GHG emissions, they must also build resilience, ensure food security, promote biodiverse ecosystems, and avoid harmful trade-offs with other sustainable development objectives.

Despite growing recognition of food systems as a key climate challenge and opportunity, many Nationally Determined Contributions (NDCs) under the Paris Agreement have only partially addressed the full scope of food system emissions and vulnerabilities. While nearly all NDCs include references to agriculture, few adopt a comprehensive approach encompassing actions across the entire food system, including production, consumption, loss and waste, and supply chain resilience. For instance, a recent analysis by the Food and Agriculture Organization (FAO) revealed that although 94% of countries identify agrifood systems as a priority for climate change adaptation and 91% for mitigation in their NDCs, significant gaps remain. Notably, current NDCs address only about 40% of agrifood system emissions, with emissions from animal agriculture particularly neglected and pre- and post-production emissions even more so (Crumpler et al. 2024).

As Parties to the Paris Agreement submit their next round of NDCs, more ambitious and integrated approaches will be necessary to align food systems with climate objectives. There are signs of growing momentum toward this. For example, the COP28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action (2023)—endorsed by over 150 countries at COP28—reinforces the importance of food systems, declaring governments' intent to integrate food systems into their NDCs as well as other related strategies. Likewise, the Alliance of Champions for Food Systems Transformation, a coalition of countries launched at COP28, has committed to driving systemic food systems change across several intervention areas to ensure alignment with global climate and biodiversity targets (Alliance of Champions 2024). Both of these initiatives have informed the development of this framework.



OBJECTIVES OF THE SCORECARD

The NDC Food Systems Scorecard is designed to:

- Provide a structured, transparent method for evaluating the inclusion of food systems in NDCs.
- Offer guidance for countries seeking to improve food-related climate actions in their NDCs.
- Highlight gaps in food system integration and encourage a more holistic approach.
- Facilitate cross-country comparisons and the identification of best practices.
- Encourage Parties to align food system measures with international climate, biodiversity, and development objectives as well as principles of inclusiveness and equity.

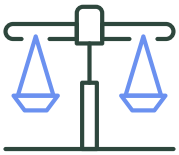
II. Framework for Scoring

The scorecard evaluates food system integration in a country's NDC across four areas: (1) Scope of Food Systems Coverage, (2) Context-Specific Action, (3) Promotion of Synergies and Avoidance of Maladaptation, and (4) Equity and Inclusiveness in NDC Development. The methodology is summarized in Appendix I.

Scope of Food Systems Coverage examines the extent to which NDCs cover action across different stages of the food value chain, recognizing that action across all stages of the food system is needed to meet climate goals but that gaps in coverage remain significant and widespread.

Context-Specific Action examines the extent to which an NDC addresses critical areas for climate action on food systems. Each Party's NDC is assessed based on issues that are likely to be particularly relevant for them, considering differences in their food systems, capacity, and responsibility.

Promoting Synergies and Avoiding Maladaptation examines the extent to which an NDC's consideration of food systems effectively reflects the range of linkages between food systems and other sustainability, social, and health objectives in a way that can result in co-benefits and navigate potential trade-offs.



Equity considers the extent to which an NDC meets key equity criteria, recognizing that equity is a critical component of fair and effective climate action. **Inclusiveness of NDC Development** considers key features of an NDC's development process, recognizing that inclusive participation is both inherently important and a critical factor for good policy-making.

The first three of these categories examine policies specific to the food system, while the fourth category (Equity and Inclusiveness) examines policies that are broader but essential to effective and equitable food systems and food systems policies.

The scorecard takes a food systems perspective (see, e.g., IPCC SRCCL, Ch. 5), and while evaluating equity and inclusiveness more broadly, this analysis is not tailored to other sectors, such as energy.

The analysis of NDCs takes into account description both within the NDC document itself and in policies the NDC references as part of the NDC. For example, if an NDC describes the country's UN Food Systems Summit National Pathway as part of its domestic institutional arrangements, the text of the UN Food Systems Summit National Pathway itself should also be examined as part of this analysis, if the policies are publicly available.

This framework typically evaluates actions taken at the governmental level of the NDC. Thus, actions undertaken by subnational entities (e.g., cities) or non-state actors (e.g., civil society organizations or businesses) are not within the scope of this analysis, even if they are mentioned in the NDC. Actions by constituent national governments (e.g., EU member states) should be considered descriptively in the assessment and may be factored into scoring where appropriate, based on a holistic consideration of their significance relative to the NDC's overall coverage.

An NDC will receive scores based on how well it performs according to the criteria for each area discussed below. Each area is scored on a scale of 0–3 points. An NDC will receive an overall score out of a total possible score of 12 points based on the sum of these scores.

A. SCOPE OF FOOD SYSTEMS COVERAGE (0–3 POINTS)

A comprehensive approach to food systems is necessary to capture the full extent of their climate mitigation and adaptation potential. This area evaluates an NDC's breadth by examining whether the NDC includes actions addressing each of the following stages:

(1) food production;
(2) food loss;
(3) food processing;
(4) food distribution;
(5) food consumption, including food access, diets, and nutrition; and
(6) food waste.

In this section, the NDC will be considered to address a stage of the food system if it describes policies (or plans to create policies) related to that stage of the food system. A policy could include requirements, prohibitions, incentives, disincentives, target-setting, guidance, taxing, spending, or collecting information. Purely descriptive mentions of a stage of the food system (e.g., that climate change has impacted food production) would not count as addressing a stage of the food system.

This category does not assess the extent to which policies might be beneficial or even harmful as these considerations are addressed in other sections of this framework.

After the stages addressed by an NDC are identified, the NDC's food systems coverage will be evaluated as follows:

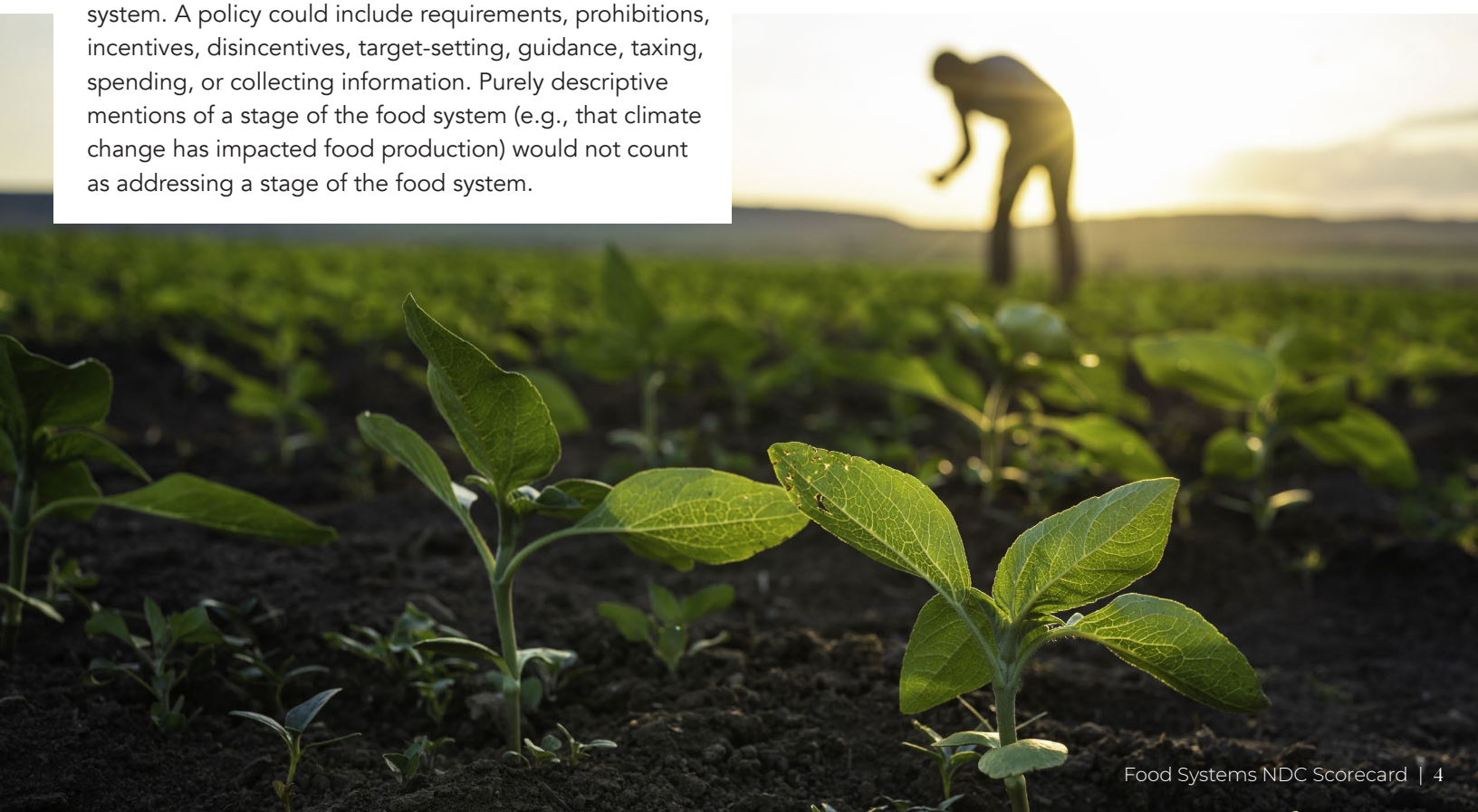
Evaluation

Strong: addressing all these stages (3 points)

Medium: addressing at least production, consumption, and either food loss or food waste (2 points)

Weak: at least one stage mentioned but not strong medium (1 point)

Absent: no mention of any stage (0 points)



FURTHER GUIDANCE

Food production

Scope: In this framework, "Food production" is understood to encompass activities that produce food in agriculture, aquaculture, and fisheries (e.g., relating to land use, growing of crops and animals, fishing) up to and including the harvest of crops, landing of fish, and also on-farm storage.

Among others, policies applicable to this section might refer to: Agriculture, aquaculture, or fisheries explicitly; Specific agricultural, livestock, or fisheries practices (e.g., crop rotation); Types of foods produced (e.g., drought-resistant crops); Animal health; Animal welfare; Age of slaughter; Number of animals slaughtered; Impacts of food production (e.g., agricultural deforestation, other land-use conversion, or land degradation); Inputs or systems for inputs such as fertilizer, water, or irrigation; Approaches to food production (such as agroecology or sustainable intensification).

Food loss

Scope: In this framework, "Food loss" is understood to relate to human-edible products that exit the supply chain on farm or after harvest, catch, or slaughter, up to and excluding activities related to retail (Babiker et al. 2022).

Among others, policies applicable to this section might refer to: Food loss explicitly; Storage; Cold chain; Preservation (including packaging, depending on context); Fisheries discards; Gleaning.

Food processing

Scope: In this framework, "Food processing" is understood to refer to activities to select or prepare food for human consumption (excluding those taking place in households or the foodservice sector).

Among others, policies applicable to this section might refer to: Food processing explicitly; Slaughter of animals; Processing of raw agricultural products (e.g., sorting, milling, refining, drying); Processing for human consumption (e.g., baking, fermenting); Food safety standards; Alternative proteins.

Food distribution

Scope: In this framework, "Food distribution" is understood to refer to activities where food moves post-harvest/slaughter/catch.

Among others, policies applicable to this section might refer to: Food distribution explicitly; Food transportation; Food import; Food export; Food supply chains.

Food consumption

Scope: In this framework, "food consumption, including food access, diets, and nutrition," is understood to refer to interventions affecting the foods individuals consume, including quantity and quality.

Among others, policies applicable to this section might refer to: Food access and consumption explicitly; Diets explicitly; Food-based dietary guidelines; Nutritional interventions (e.g., food-specific social safety net programs, such as direct food provision or food stamps); Public food procurement; Changes to food environments, including those relating to retail and institutional environments, such as schools; Increasing or decreasing consumption of particular food types (such as vegetables or processed foods), including through financial incentives (such as taxes or support); Food labeling (such as for emissions), excluding labeling relating only to production methods.

Food waste

Scope: In this framework, "Waste" refers to the loss of human-edible food, including inedible parts, from the retail stage onward.

Among others, policies applicable to this section might refer to: Food waste explicitly; Organic waste bans; Date labeling reforms; Redirection initiatives (e.g., food banking); Repurposing initiatives (e.g., composting; use for energy, feed, or upcycling into new food or other products).

Other issues

For the purposes of the assessment in this section, a policy can count as addressing multiple stages of the food system. For example, an NDC that contains a policy subsidizing refrigerated transport to reduce food loss would address both food distribution and food loss.

B. CONTEXT-SPECIFIC ACTION (0–3 POINTS)

To evaluate the depth of food systems integration within NDCs, this framework examines the strength of commitments (discussed further below) in seven subareas where global progress is critical for climate change mitigation and adaptation in the food system:

(1) addressing food insecurity and malnutrition;
(2) mitigating emissions in food production;
(3) reducing agricultural deforestation;
(4) shifting from high-impact dietary patterns;
(5) reducing food loss and waste;
(6) reducing fossil fuel use in the food system; and
(7) enhancing climate-resilient food production.

Addressing food insecurity and malnutrition

Crucially, food insecurity and malnutrition remain pressing concerns, particularly in low- and middle-income countries (Appendix II). Almost 30% of the global population—2.4 billion people—were moderately or severely food insecure in 2022, and food insecurity may continue to increase due to climate impacts such as agricultural productivity decreases amid climate change (FAO et al., 2023). As part of adaptation, NDCs can benefit from outlining national food-security strategies, nutrition-sensitive policies, and social-protection measures targeting vulnerable populations. This framework evaluates whether commitments from low- and middle-income countries address hunger reduction, nutritional improvements, and resilience-building within food systems to support equitable climate adaptation.

Mitigating emissions in food production

Food systems account for over 30% of total GHG emissions; around 70% of that comes from food production (Crippa et al. 2021). When it comes to mitigating through food production, high-income and upper-middle-income countries bear the greatest responsibility given their access to technological advancements and financial resources. This analysis focuses on whether NDCs from these countries (Appendix II) contain measures to transition to less carbon-intensive forms of food production.

Reducing agricultural deforestation

Deforestation linked to agriculture is another critical concern. Deforestation and degradation of forests accounts for approximately 11% of global GHG emissions (UNEP 2021), with agricultural expansion driving almost 90% of global deforestation (FAO 2021). As the relevance of deforestation varies widely among countries, this framework assesses the 25 countries with the highest annual deforestation rates driven by commodity production and shifting agriculture (Appendix III). Along with this, we recognize that many countries have opportunities to help address deforestation and encourage assessing countries outside the list in Appendix III where this could be considered highly relevant in light of national circumstances (e.g., major importers of deforestation-linked agricultural commodities).

This framework assesses references in NDCs to deforestation and related issues, including policies that incorporate zero-deforestation supply chain commitments, land-use governance improvements, and financial mechanisms that disincentivize forest clearance for agricultural purposes. This subarea is assessed for all countries but scored only for the applicable grouping per the methodology.

Shifting from high-impact dietary patterns

The framework also evaluates whether NDCs address shifting from high-impact dietary patterns. Shifting diets has the potential to mitigate up to 8Gt CO2-eq annually (Creutzig et al. 2022 5.3.1.1). Shifts away from animal-source food (ASF) consumption unlock the greatest potential from dietary shifts (UNEP, 2022). ASFs tend to be significantly more intensive in terms of emissions, land use, and other environmental impacts than plant-based foods, including fruits, vegetables, legumes, and nuts; animal agriculture, including animal feed, accounts for 12–20% of total global GHG emissions and is responsible for nearly 60% of the food system's emissions (FAO, n.d.; Xu et al. 2021). Furthermore, high intake of ASFs, in particular red and processed meats, has been associated with increased risk of a range of adverse health outcomes, including obesity, cardiovascular disease, type II diabetes, and certain types of cancer (UNEP 2023).

The EAT-Lancet Planetary Health Diet identifies ranges of consumption for particular food groups that are within planetary boundaries, including for GHG emissions (Willet et al. 2019). This evaluation framework, therefore, considers whether relevant countries—those whose consumption of ASFs exceeds EAT-Lancet recommendations by 25%—include in their NDCs measures to encourage shifts to healthier, less impactful diets. This 25% buffer is intended to account for uneven distribution of ASFs within countries as well as variation in the nutrient density of food groups for each country relative to the average values used by EAT-Lancet. Based on FAO-Stat data, 122 countries fall into this category (Appendix IV). Their NDCs are examined for references

to high-impact dietary patterns and related issues, including strategies that promote plant-based diets, reduce ASF overconsumption, and otherwise incentivize more sustainable food choices, including through tax reforms, food-based dietary guidelines, and educational campaigns.

Reducing food loss and/or waste

"Food loss" refers to losses of human-edible food at the place of production, post-harvest, in transport, and during the food processing/wholesale stages of a food supply chain. "Food waste" refers to those from the retail stage onward, including from households and foodservice establishments (See IPCC AR6 2022 WG III, 12.4.3). Both contribute to food insecurity, account for about 8–10% of global GHG emissions, and use the equivalent of nearly 30% of the world's agricultural land (UNEP 2024). Food loss and waste reduction are critical for climate mitigation, climate adaptation, and sustainable development; accordingly, this framework evaluates references to food loss and waste and related issues, including to policies and measures aimed at prevention, recovery, and redistribution. For the purposes of scoring, addressing either food loss or food waste alone is sufficient.

Reducing fossil fuel use in the food system

The reduction of fossil fuels from all stages of food systems is assessed for high-income and upper-middle-income countries. Food systems account for at least 15% of fossil fuel use annually (Global Alliance for the Future of Food 2023). Fossil fuel use is prevalent across food production, storage, and transport; thus, this framework reviews whether NDCs reference this issue or include policies such as those supporting the electrification of agricultural machinery; renewable energy, such as agrivoltaics; the phaseout of fossil fuel subsidies; and incentives for sustainable energy adoption in food supply chains. Additionally, economy-wide fossil fuel reduction policies can reduce fossil fuel use in the food system.

Enhancing climate-resilient food production

Enhancing climate-resilient food production is a necessary adaptation measure across regions. As climate change threatens agricultural productivity through shifting rainfall patterns, increased temperatures, and extreme weather events, NDCs must prioritize various climate-resilient agricultural practices and production systems. This framework examines whether NDCs include such measures.

By systematically analyzing NDCs against these seven thematic subareas, this methodology provides a structured approach to assessing the extent to which key action areas for sustainable, resilient, and healthy food systems have been considered in countries' NDCs. The evaluation considers alignment with national contexts, international climate commitments, and the broader goals of the Paris Agreement.

Evaluation

First, a Party's NDC is assessed for whether the action in each subarea applicable to it is strong, medium, weak, or absent.

Strong: concrete action (specific policy adopted; plan to adopt a specific policy, including conditionally based on finance; quantifiable target; time-bound target; or financial commitment)

Medium: intent to take some action mentioned. This can include the following:

- an explicit policy direction or goal without a detailed implementation plan;
- a commitment to exploring policy options or developing a plan; and
- a mention of potential measures but without a timeline, quantifiable target, or financial commitment.

Weak: only a descriptive mention (e.g., climate change as impacting food security)

Absent: no mention

Following this, these results are used to evaluate whether the NDC's context-specific action overall is strong, medium, weak, or absent as follows:

Strong (3 points)

- At least medium on all applicable subareas and strong on at least one applicable subarea

Medium (2 points)

- Medium on all applicable subareas
- At least medium on more than half of applicable subareas
- Strong in two subareas, weak or absent in most other applicable subareas

Weak (1 point)

- Weak or absent on more than half of applicable subareas but not entirely absent; not strong

Absent (0 points)

- No mention of any applicable subareas

FURTHER GUIDANCE

Addressing food insecurity and malnutrition

Scope: This subarea considers issues and actions relevant to food insecurity and malnutrition at all stages of the food system.

Among others, policies or considerations applicable to this subarea might refer to: Nutrition or malnutrition; Fortification; Social-safety-net programs (e.g., cash transfers, food vouchers, and emergency food assistance); School food programs; Diversifying diets; Reducing foodborne disease; Diversifying food supply chains; Increasing local production (if linked to improving food security and nutrition); Promoting or supporting consumption of particular food products (if linked to food insecurity and malnutrition).

Mitigating emissions in food production

Scope: This subarea considers issues and actions relevant to mitigation of food production emissions, including reducing emissions and sequestering carbon. It is stage-specific (i.e., it does not include demand-side mitigation, such as reducing production emissions through addressing diets and reducing food waste).

Among others, policies or considerations applicable to this subarea could include references to: Reducing fertilizer use; Reducing methane emissions from rice; Management of livestock manure, nutrients, and/or fertilizers; Management of rangelands and/or croplands; Soil carbon sequestration; Reducing tillage; Improving crop rotation; Management of crop residues or reducing crop burning; Improving soil health; Reducing conversion of natural habitats (other than forests), such as wetlands or grasslands.

Reducing agricultural deforestation

Scope: This subarea considers the protection or restoration of forests. For the purposes of this evaluation, references to deforestation in the NDCs do not need to specify the deforestation driver.

Among others, policies or considerations applicable to this subarea might refer to: Deforestation, directly; Promoting certification, supply chain traceability, or reducing subsidies or price supports for key deforestation-related food commodities (cattle/beef, soy, cocoa, palm oil, coffee); Reforestation; Forest conservation or protection; REDD+.

Shifting from high-impact dietary patterns

Scope: This subarea considers reducing the impact intensity (whether related to GHG emissions or other impacts, such as water use) of dietary patterns in the country of the NDC. References to "healthy diets" alone or references to reducing the emissions intensity of a particular food without changes to dietary patterns would not fall within scope.

Among others, policies or considerations applicable to this subarea might refer to: Increasing production of fruits, vegetables, legumes, or nuts (if the policies, implicitly or explicitly, describe a link to consumption domestically); Sustainable diets or food consumption patterns; Emissions labeling for food; Increasing fruit, vegetable, nut, or legume consumption or reducing consumption of animal-source foods—including through reforming food taxes and subsidies; Food-based dietary guidelines; Plant-based diets; Home gardening incentives if the produce grown will replace food types that are emissions intensive.

Reducing food loss and/or waste

Scope: This subarea considers avoiding losses or managing losses (e.g., through repurposing) of human-edible food products from the place of production (farms, fishing vessels, etc.) through to consumers and including landfills. More general references to waste or organic waste would not be within scope unless paired with some more explicit (e.g., mention of food) or implicit (e.g., a ban that would necessarily implicate food) link to food loss and waste. This methodology defines food loss in terms of direct edibility, which narrows its scope; policies reducing fruit or vegetable losses are counted, but animal losses fall outside the definition since animals require further processing before becoming edible.

Among others, policies or considerations applicable to this subarea might refer to: Food loss or waste explicitly; Storage; Cold chain; Preservation (including packaging depending on context); Fisheries discards; Gleaning; Organic waste bans; Date labeling reforms; Redirection initiatives (e.g., food banking); Repurposing initiatives (e.g., composting; use for energy, feed, or upcycling into new food or other products).

Reducing fossil fuel use in the food system

Scope: This subarea considers directly reducing fossil fuel energy usage (such as on-farm and later in the supply chain), as well as reducing fossil-fuel-derived inputs. It also includes broader economy-wide policies, such as grid decarbonization and full fossil fuel phaseouts, where these can implicitly be assumed to impact food systems.

Among others, policies or considerations applicable to this subarea could include references to: Electrifying on-farm machinery, ishing vessels, food-processing facilities, or food transport; Reducing fertilizers, plastics, and pesticides in food systems; Replacing fossil fuel inputs, including by shifting to organic fertilizers; Reducing or eliminating plastics; Biological pest management; Promoting agrivoltaics and alternative fuels, such as green hydrogen, in the food system.

Enhancing climate-resilient food production

Scope: This subarea considers improving the ability of food production systems to cope with climate impacts, including disasters and slow-onset events.

Among others, policies or considerations applicable to this subarea could include references to: Climate resilience for crop or livestock, directly; Crop or livestock breeding or genetics; Farmer training or technical support (with reference to climate impacts, adaptation, or resilience); Irrigation; Rainwater-harvesting; Crop or agricultural diversification; Integrated pest management; Early warning systems in agriculture; Addressing crop, farmed animal, or livestock pathogens (e.g., biosecurity); Soil management; Vulnerability or climate-impact assessments (for the food system, agriculture, or fisheries); Holistic approaches, including agroecology or climate-smart agriculture (with reference to climate impacts, adaptation, or resilience).

Other issues

For the purposes of the assessment in this section, unless otherwise noted above, a policy can count as addressing multiple subareas. For example, an NDC that contains a policy relating to reducing overuse of synthetic fertilizers could address both *mitigating emissions in food production* and *reducing fossil fuel use in the food system*.

References to commitments to take action (e.g., that a country endorsed the UAE COP28 Declaration on Sustainable Agriculture, Resilient Food Systems and Climate Action), without further plans or declarations of intent to implement these, would be evaluated as "Weak" strength of action.

C. PROMOTING SYNERGIES AND AVOIDING MALADAPTATION (0–3 POINTS)

Measures detailed in an NDC have the ability to promote synergies with other sustainability, social, and health objectives. Conversely, measures may also conflict with such objectives. This section considers the extent to which Parties' NDCs seek to promote synergies and avoid maladaptation, or trade-offs, with other sustainable development objectives. The topics identified below are informed by relevant initiatives and documents, such as the COP28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action; the Alliance of Champions for Food Systems Transformation; and the COP28 UAE Declaration on Climate and Health.

First, an NDC is evaluated on whether it considers the following topics in the context of the food system, which can support broader sustainable development synergies:

(1) nutrition;
(2) One Health, animal health, and/or animal welfare;
(3) other health considerations;
(4) human rights;
(5) biodiversity, nature, and ecosystems;
(6) gender; and
(7) small-scale producers (i.e., smallholder farmers, small-scale fishers, and pastoralists).

Second, an NDC is evaluated on the risks of maladaptation related to the inclusion of the following high-risk activities:

(1) expansion of agricultural frontier;
(2) increasing production of crops primarily for nonfood uses (animal feed and energy), such as soy, corn, rapeseed, wheat, and sugarcane;
(3) increasing pesticide use;
(4) intensification measures that threaten the livelihood of small-scale farmers and pastoralists, and fishers; and
(5) increasing water consumption.

For high- and upper-middle-income countries (Appendix II), the evaluation additionally includes the following high-risk policies:

(6) intensification of animal agriculture and expansion of animal agriculture subsectors;
(7) increasing consumption of particular animal products in a country that already exceeds by 25% or more EAT-Lancet levels for ASF consumption (Appendix IV); and
(8) increasing fertilizer usage.

Any other high-risk policies identified during the assessment but not mentioned here should also be included and scored in the evaluation.

Likewise, a policy may be deemed to not be high-risk if expert opinion indicates it is contextually necessary for achieving a critical policy objective (such as food security) with no less harmful alternatives.

Evaluation

For the synergy and maladaptation subareas:

- Step one: An NDC earns 0.5 points for each synergistic topic mentioned, up to a maximum of three points.
- Step two: An NDC can lose 1 point for each high-risk activity or policy that may result from NDC actions if the NDC lacks appropriate and adequate measures needed to mitigate potential negative impacts.

In aggregate:

Strong: 2.5–3 aggregated points in this section

Medium: 1.5–2 aggregated points in this section

Weak: 0.5–1 aggregated points in this section

Very weak: 0 aggregated points in this section

While the points for synergies may be fewer than the points subtracted due to maladaptation, any resultant negative scores for this area will be increased to zero, the area's minimum score.

FURTHER GUIDANCE

For further discussion of synergies and trade-offs involving the topics in this section, see IPCC SRCCL, Ch. 5, IPCC AR6 WG3 Ch. 12, Measures for minimizing the adverse impact of climate change on the full realization of the right to food, Verkuijl et al., Climate change, public health, and animal welfare: towards a One Health approach to reducing animal agriculture's climate footprint, 2024.

Synergies

Nutrition

This could also include, among others, references to: Nutrition, directly; Malnutrition; Wasting; Stunting; Micronutrient deficiencies in general or in relation to specific micronutrients; Surplus nutrition.

This would not include references to food security, broadly, unless in relation to a nutritional issue such as those noted above.

One Health, animal health, and/or animal welfare

This could include, among others, references to: Animal health, animal welfare, or One Health, directly; Zoonotic diseases; Animal diseases; Livestock health; Livestock mortality; Veterinary care; Primary pandemic prevention; Biosecurity.

These references should specifically relate to the food system or parts of the food system.

Other health considerations

This could include, among others, references to: Health, directly; Noncommunicable diseases; Worker health and safety; Health systems; Sanitation; Air pollution.

These references should specifically relate to the food system or parts of the food system.

Human rights

This could include, among others, references to: Human rights, directly; Land tenure; Right to food; Labor rights; Ensuring rights for Indigenous Peoples.

These references should specifically relate to the food system or parts of the food system.

Biodiversity, nature, and ecosystems

This could include, among others, references to: Biodiversity, nature, or ecosystems, directly; Agroecology; Nature-positive production; Ecosystem-based adaptation; Rewilding; Minimizing bycatch; Marine Protected Areas; Conservation.

These references should specifically relate to the food system or parts of the food system.

Gender

This could include, among others, references to: Gender, directly; Specific impacts or considerations for women, girls, and gender-diverse persons.

These references should specifically relate to the food system or parts of the food system.

Small-scale producers (i.e., smallholder farmers, small-scale fishers, and pastoralists)

This could include, among others, references to: Smallholder farmers, small-scale fishers, and pastoralists, directly; Subsistence farmers or fishers; Artisanal fishers.

Other issues

For the purposes of the assessment in this section, the relevant question is whether the NDC shows explicit consideration of a synergy rather than whether a policy would yield benefits toward an issue.

Maladaptation

Expansion of agricultural frontier

Among others, policies or considerations applicable to this subarea might refer to: Increasing land area under cultivation; Expanding agriculture; Land clearance.

Increasing production of crops for animal feed and energy

Among others, policies or considerations applicable to this subarea might refer to: Increasing biofuel or feed production; Increasing production of soy, corn, rapeseed, wheat, or sugarcane; Intensifying agricultural production to meet demand for livestock feed and biofuels.

Increasing pesticide use

Among others, policies or considerations applicable to this subarea might refer to: Increasing [chemical or inorganic] pesticides (including herbicides and fungicides).

Intensification measures that threaten the livelihood of small-scale farmers, pastoralists, and fishers

Among others, policies or considerations applicable to this subarea might refer to: Consolidating farms, Establishing megafarms, Increasing fishing vessel size.

Increasing water consumption

Among others, policies or considerations applicable to this subarea might refer to: Increasing groundwater extraction for crop or livestock production; Promoting water-intensive crops or livestock, such as rice, sugarcane, alfalfa, beef, or dairy; Increasing irrigation.

Determining risk for this subarea will depend on whether the country commonly experiences water shortages from, among others, drought, saltwater intrusion, arid conditions, or pollution.

D. EQUITY AND INCLUSIVENESS IN NDC DEVELOPMENT (0–3 POINTS)

This area evaluates an NDC across two main subareas: equity and inclusiveness in NDC development. Each subarea is evaluated on a 0–3 scale, and the score of this overall category will be the average of both. This section focuses on the NDC overall, rather than the food system in particular, because actions on these issues are often nonsectoral and can, in some cases, support sustainable food systems even where the action takes place outside the food system.

Equity

Ensuring that climate action is just and equitable is a foundational principle of the Paris Agreement. This framework evaluates NDCs on the following issues:

(1) equitable 1.5°C alignment;
(2) just transitions;
(3) considering the needs of marginalized and/or vulnerable groups; and
(4) equitable finance.

Equitable 1.5°C alignment

Achieving climate mitigation is critical to food systems. The Paris Agreement recognizes that responsibility and capability should inform the ambition of a country's mitigation efforts toward this. Thus, the mitigation ambition of each NDC will be evaluated based on its alignment with each country's fair contribution to global mitigation consistent with the 1.5°C temperature limit. Each country's contribution to global mitigation is assessed using the fair shares assessment approach of the Civil Society Equity Review (CSER) based on the Climate Equity Reference Calculator framework (Holz et al. 2018). This framework explicitly takes into account three of the four dimensions of equity principles of burden-sharing frameworks that have been identified by the IPCC—namely, historic responsibility, capacity (ability to pay), and right to development. The fourth dimension, equality, is implemented implicitly (Holz et al. 2018). This quantitative framework accommodates a broad range of ethical perspectives, yet is robustly based on relevant climate science as summarized by the IPCC, driven by empirical data, and grounded in the foundational equity principles that governments have agreed to in the UNFCCC. Since 2015, the CSER has issued annual updates to its assessment of countries' NDCs, and is in the process of assessing the current round of NDCs as countries announce them. See the "Further Guidance" section below for specific instructions on using the Climate Equity Reference (CER) Calculator to evaluate the *Equitable 1.5°C alignment* of a country's NDC.

The CER Calculator displays a country report with a chart and table, showing a country's fair share of 1.5°C-consistent global mitigation. The lower part of the table shows the country's NDC pledges and indicates whether the NDC meets its "mitigation fair share," thereby showing whether it is equitably aligned with the 1.5°C target.[1] Note that some countries' NDCs set out a range of possible ambition rather than a single emissions-reduction figure; in these cases we recommend assessing whether their least ambitious pathway would be 1.5°C aligned. The CSER methodology uses two equity benchmarks that reflect two different visions of what constitutes "fairness" in mitigation effort sharing. Accordingly, we recommend evaluating this subarea based on the CSER benchmark corresponding with the less ambitious demands on a country's mitigation effort. In practice, this means that if the country meets its fair share according to one of the benchmarks, it can be considered to meet its fair share generally.

One important caveat is that, while the CER Calculator includes emissions from agriculture, it typically does not account for emissions or removals from the Land Use, Land-Use Change and Forestry (LULUCF) sector. This partial coverage is due to a combination of data availability challenges and other methodological considerations. This is a common constraint across scholarly efforts to assess equitable mitigation. As a result, the CER Calculator may only partially capture equity considerations related to the food system. Nonetheless, it remains a valuable tool for deriving insights into whether a country's overall mitigation pledge, including various elements related to the food system, is aligned with the country's fair share under the 1.5°C goal.

If you are expecting to see results for a specific country and they are not yet available, please contact calculator@climateequityreference.org, and the team will aim to resolve this as soon as possible.

Just transitions

Just transitions are important for addressing the impact of climate change mitigation and adaptation measures on workers, communities, consumers, and other stakeholders. NDCs are thus evaluated based on whether they contain

[1] The CER Calculator will indicate either the "Amount by which this pledge falls short of mitigation fair share" or "Amount by which this pledge exceeds mitigation fair share."

concrete measures to promote just transitions. In the context of economic transitions, this includes references to (or intent to establish) inclusive, participatory, and/or democratic decision-making processes for a transition; it also includes economic policies that benefit those within the food system most impacted (such as subsidies for small/marginalized farmers, fair prices for crops, or livable wages for farmworkers and food chain workers) and economic policies more broadly (e.g., provisioning funding for retraining workers).

Specific consideration of the needs of marginalized and/or vulnerable groups

Climate change and measures to mitigate climate change and its impacts frequently disproportionately affect those from vulnerable groups (Levy and Patz 2025). Specific consideration of these groups is important for reducing the risk of overlooking their needs in the policy-making process. NDCs are thus assessed based on whether they specifically consider the needs of women, youth, and Indigenous Peoples.

Equitable finance

Finance from developed to developing countries is critical for ensuring that developing countries are able to adapt to climate impact and to contribute to mitigation efforts across all sectors. NDCs from high-income countries (Appendix II) will thus be evaluated on whether they commit (or communicate previous commitments) to financing for developing countries.

Evaluation for the equity subarea (considering the four issues discussed above)

Strong (3 points): all issues addressed

Medium (2 points): 2 or 3 issues addressed

Weak (1 point): 1 issue addressed

Absent (0 points): no issues addressed

Inclusiveness in NDC Development

Legitimate and effective NDCs require inclusive and participatory development processes. Broad stakeholder engagement enhances policy coherence, strengthens accountability, and ensures that climate strategies reflect diverse perspectives and expertise that can lead to stronger, fairer, and more holistic climate action in the food system. Informed by the inclusivity parameters of UNDP's (n.d.) NDC Quality Assurance Checklist, each NDC is evaluated based on whether it includes the following groups in its development:

(1) multiple government ministries;
(2) departments, agencies of government;
(3) subnational bodies;
(4) the private sector;
(5) academia;
(6) civil society organizations;
(7) Indigenous Peoples; and
(8) other vulnerable and/or marginalized groups (e.g., women; youth; people of diverse gender identities and sexual orientations; ethnic, racial, religious, and linguistic minorities; persons with disabilities).

Evaluation: ½ point is given for each topic mentioned, up to a maximum of three points.

Strong: 2.5–3 points in this subarea

Medium: 1.5–2 aggregated points in this subarea

Weak: 0.5–1 aggregated points in this subarea

Absent: 0 aggregated points in this subarea

Points for the Equity and Inclusiveness in NDC Development section are calculated by taking the average of the points from the Equity subarea and the points from the Inclusiveness in NDC Development subarea.

Strong: 2.5–3 points

Medium: 1.5–2 points

Weak: 0.5–1 points

Absent: 0 points

FURTHER GUIDANCE

Generally, these subareas should be interpreted with reasonable breadth. For example, inclusion of the private sector might involve references to companies, corporations, or businesses.

However, references should specifically confirm a group's involvement in the NDC process.

Equitable 1.5°C Alignment

By using the CER Calculator, one can determine whether an NDC is equitably aligned with the 1.5°C temperature limit, according to the CSER methodology. To do so, use the following instructions to evaluate an NDC's mitigation commitments relative to both benchmarks described below (as stipulated by the CSER methodology). Compliance with either Benchmark 1 or Benchmark 2 will be deemed sufficient for this subarea.

Benchmark 1: 1850|High-Progressivity

1. Click here to load the CER Calculator with the benchmark settings preset to 1850|High-Progressivity.
    a. You may also navigate to the home page of the CER Calculator and manually set these benchmark settings: https://calculator.climateequityreference.org/.
2. Select for the country or region of interest.
3. Perform evaluation for Benchmark 1.
    a. **Option 1: Employ the evaluation completed by the CER Calculator team if it has been completed** (if not, you may contact calculator@climateequityreference.org):
        i. If the CER Calculator team has already performed this evaluation for the selected country's most recent NDC, you will see a subtable below stating the mitigation pledge from the selected country's recent NDC. In this case, the last line in the table will be "Amount by which this pledge falls short of mitigation fair share" or "Amount by which this pledge exceeds mitigation fair share." If the former appears in the table and the value is positive, it is clear that this country's pledge falls short of its mitigation fair share.
            1. For example, the results for the United Kingdom (UK) from the CER Calculator (Table 1) indicate that its fair share of mitigation is 16.7.
            2. *tCO_2e/capita.*[2] In its most recent NDC, the UK pledged to reduce its emissions by *5.1 tCO_2e/capita* below baseline. Thus, the amount by which this pledge falls short of mitigation fair share is *11.7 tCO_2e/capita*, meaning that the UK's pledge falls short of the country's mitigation fair share.
    b. **Option 2: Conduct a self-evaluation using the CER Calculator.**
        i. *Note:* Self-evaluation is only possible for:
            1. countries with low greenhouse gas emissions from land use, land use change, and forestry (LULUCF). LULUCF emissions are not considered in the CER Calculator.
            2. countries whose emissions-reduction target—as asserted in their NDCs—is stated in terms of "absolute" or "overall" emissions (rather than "relative" emissions).
        ii. From a country's NDC, find the stated emissions-reduction pledge.
        iii. In the CER Calculator, select the "Base Year for table" that is consistent with the NDC's emissions-reduction target.
            1. For example, the most recent NDC for the United Kingdom (UK) pledges to reduce total emissions by 81% compared to 1990 by 2035. In this case "Base Year for table" will be set to 1990.
        iv. Compare the emissions-reduction target given in a country's NDC (81% for the UK example stated above) with the value in the CER Calculator's results for "[Country] emissions allocation, projected to 2035… as percent below [Base Year] emissions" (reported as 184% in Table 1 below). If the percent decrease in emissions stated in the pledge of a country's NDC falls short of the fair-share emissions allocation (stated as a percentage relative to the same Base Year), then this country's pledge is deemed insufficient for this benchmark.

[2] This unit is measured in tonnes of carbon dioxide equivalent per capita. This includes other greenhouse gasses weighted by radiative forcing potency and atmospheric lifespan of each gas.

1. For example, the UK's pledge (81%, as stated above) falls short of its fair share (184%, as stated above) seen in Table 1 below. This means that according to Benchmark 1, the UK's mitigation pledge is not deemed adequate for *Equitable 1.5°C Alignment*.

Benchmark 2: 1950|Medium-Progressivity

4. Repeat this process for Benchmark 2 (by clicking here).

Fair shares and pledges		
United Kingdom baseline emissions, projected to 2035		507 $MtCO_2e$
Global mitigation requirement below global baseline, projected to 2035	(A)	38,857 $MtCO_2e$
United Kingdom share of global Responsibility Capacity Index in 2025 to 2035 period	(B)	3.0%
United Kingdom mitigation fair share, projected to 2035	(A × B)	
as tonnes below baseline		1,175 $MtCO_2e$
as tonnes per capita below baseline		16.7 tCO_2e/cap
as percent below baseline		232%
Averagge per capita fair share of global costs, expressed in financial terms		
Mitigation costs (assuming incremental global mitigation costs = 1.0% of GWP)		$537
Adaptation cost (assuming global adaptation costs = 1.0% of GWP)		$537
United Kingdom 1990 emissions		799 $MtCO_2e$
United Kingdom emissions allocation, projected to 2035		
as tonnes		-668 $MtCO_2e$
as tonnes per capita		-9.5 tCO_2e
as percent of 1990 emissions		-84%
as percent below 1990 emissions		184%
United Kingdom unconditional pledge: UK 2035 NDC: reduce total emissions by 81% compared to 1990 by 2035 by 2035		
in tonnes below baseline		355 $MtCO_2e$
in tonnes per capita below baseline		5.1 tCO_2e/cap
as percent below baseline		70%
Amount by which this pledge falls short of mitigation fair share		11.7 tCO_2e/cap

Table 1: An example of results from the CER Calculator for the UK using the 1850|High-Progressivity benchmark

E. FINAL SCORE AND INTERPRETATION (0–12 POINTS)

A. Evaluate action across areas based on these criteria:
    1. Scope of Food Systems Coverage
    2. Context-Specific Action
    3. Promoting Synergies and Avoiding Maladaptation
    4. Equity and Inclusiveness of NDC Development
B. Aggregate scores to provide a topline evaluation.

Aggregated evaluation—overall quality of food systems action:

Very strong = 10.25–12 points

Strong = 8.25–10 points

Medium = 6.25–8 points

Weak = 3.25–6 points

Very weak = 0–3 points

Note: The Food Systems NDC Scorecard focuses on a food system perspective. While evaluating equity and inclusiveness more broadly, it does not specifically assess other sectors (such as energy) or indicate the quality of a country's climate policy overall. Additionally, the scoring reflects the presence or absence of particular types of action or consideration within the areas and subareas examined. This does not necessarily reflect ambition in the depth of action. For example, a policy to slightly mitigate food production emissions in a subsector will count equally in scoring to a policy to significantly mitigate emissions. The scores should be understood as indicators to consider alongside the fuller analyses.

Further, NDCs are specific policy instruments that do not always reflect a country's overall policy landscape or action. Strong language on human rights, for example, can be a positive component of an NDC but should not be interpreted as evidence that a country's other policies or its actions on human rights are also positive. Rather, NDCs should be considered with appropriate awareness of broader contexts.

Finally, while NDCs are critical, implementation is necessary to translate the ambition into action. Accordingly, an ambitious NDC alone does not guarantee effective action, just as the ambitiousness of action is not limited to the content of an NDC.

Acknowledgments

Technical support for the development of this methodology was provided by William Babis and Cleo Verkuijl at the Stockholm Environment Institute (SEI) US.

The Core Partners for the methodology development phase of the Food Systems NDC Scorecard Project were Mercy For Animals, Center for Biological Diversity, EAT, Global Alliance for Improved Nutrition, and Global Law Alliance for Animals and the Environment at Lewis & Clark Law School.

We thank the following individuals for their time spent in reviewing and providing feedback: Lujain Alqodmani (EAT), Oliver Camp (GAIN), Stephanie Feldstein (CBD), Jonathan Green (SEI York), Sivan Kartha (SEI US), Professor Erica Lyman (Global Law Alliance for Animals and the Environment at Lewis & Clark Law School), Amelia Linn (Mercy For Animals), Sebastian Osborn (Mercy For Animals), Ceecee Holz (Climate Equity Reference Project), and Zoha Shawoo (SEI US).

We wish to acknowledge other initiatives and reports that have provided inspiration for this project, including the Healthy NDCs Scorecard, Initiative on Climate Action and Nutrition (I-CAN), Food Forward NDCs, Enhancing Food Systems for NDCs, and *A Practical Guide to Assessing Food Systems in Nationally Determined Contributions*.

This scorecard methodology is open to feedback and possible revisions. Please contact Sebastian Osborn (sebastian.osborn@mercyforanimals.org) with any feedback, comments, or questions.

References

Alliance of Champions for Food Systems Transformation. (2024). *Ministerial Statement on Food Systems Transformation. Alliance of Champions.* Retrieved from https://allianceofchampions.org/wp-content/uploads/2024/11/ACF-Ministerial-Statement-.pdf. [Accessed 17 March 2025.]

Babiker, M., G. Berndes, K. Blok, B. Cohen, A. Cowie, O. Geden, V. Ginzburg, A. Leip, P. Smith, M. Sugiyama, F. Yamba. (2022). Cross-sectoral perspectives. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. https://doi.org/10.1017/9781009157926.005

Clark, M. A., Domingo, N. G. G., Colgan, K., Thakrar, S. K., Tilman, D., Lynch, J., Azevedo, I. L., & Hill, J. D. (2020). Global food system emissions could preclude achieving the 1.5° and 2°C climate change targets. Science, 370(6517), 705–708. https://doi.org/10.1126/science.aba7357

COP28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action (2023). Retrieved from https://sdg2advocacyhub.org/wp-content/uploads/2023/12/COP28-UAE-Declaration-on-Sustainable-Agriculture-Resilient-Food-Systems-and-Climate-Action.pdf. [Accessed 17 March 2025.]

Creutzig, F., J. Roy, P. Devine-Wright, J. Díaz-José, F.W. Geels, A. Grubler, N. Maïzi, E. Masanet, Y. Mulugetta, C.D. Onyige, P.E. Perkins, A. Sanches-Pereira, E.U. Weber. (2022): Demand, services and social aspects of mitigation. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change[P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. https://doi.org/10.1017/9781009157926.007.

Crippa, M., Solazzo, E., Guizzardi, D. *et al.* (2021). Food systems are responsible for a third of global anthropogenic GHG emissions. Nat Food 2, 198–209. https://doi.org/10.1038/s43016-021-00225-9

Crumpler, K., Wybieralska, A., Roffredi, L., Tanganelli, E., Angioni, C., Prosperi, P., Umulisa, V., Dahlet, G., Nelson, S., Rai, N., Schiettecatte, L.S., Salvatore, M., Wolf, J. & Bernoux, M. 2024. Agrifood systems in nationally determined contributions: Global analysis – Key findings. Rome, FAO. https://doi.org/10.4060/cd3210en

FAO . (2021). FAO Remote Sensing Survey reveals tropical rainforests under pressure as agricultural expansion drives global deforestation. Retrieved from https://openknowledge.fao.org/server/api/core/bitstreams/fe22a597-a39d-4765-8393-95fbcaed6416/content. [Accessed 17 March 2025.]

FAO (n.d). FAO GLEAM v3.0 dashboard. Emissions. https://foodandagricultureorganization.shinyapps.io/GLEAMV3_Public/

FAO. (2023). Alliance of Champions for *Food Systems Transformation: Call to Action*. FAO. https://www.fao.org/food-systems/commitments/alliance-of-champions/en/. [Accessed 17 March 2025.]

FAO, IFAD, UNICEF, WFP and WHO. (2023). The State of Food Security and Nutrition in the World 2023. Urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum. Rome, FAO. https://doi.org/10.4060/cc3017en

FAO. (2024). *Food balances (2010–2022): Global, regional and country trends*. FAOSTAT Analytical Brief 91. Rome: FAO. Retrieved from https://www.fao.org/statistics/highlights-archive/highlights-detail/food-balance-sheets-2010-2022-global-regional-and-country-trends/en [Accessed 17 March 2025.]

Global Alliance for the Future of Food. (2023). *Power Shift: Why We Need to Wean Industrial Food Systems Off Fossil Fuels*. Global Alliance for the Future of Food. https://futureoffood.org/wp-content/uploads/2023/10/ga_food-energy-nexus_report.pdf

Hansen, M.C., P.V. Potapov, R. Moore, et al. (2013). "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342: 850–53. Data available online from: https://glad.earthengine.app/view/global-forest-change [Accessed 17 March 2025.]

Holz, C., Kartha, S., & Athanasiou, T. (2018). Fairly sharing 1.5: national fair shares of a 1.5 C-compliant global mitigation effort. *International environmental agreements: politics, law and economics*, 18(1), 117-134.

IPCC (Intergovernmental Panel on Climate Change). (2019). *Climate change and land: An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*. IPCC. https://www.ipcc.ch/site/assets/uploads/2019/11/SRCCL-Full-Report-Compiled-191128.pdf

Levy, B. S., & Patz, J. A. (2015). Climate change, human rights, and social justice. *Annals of global health*, 81(3), 310-322.

United Arab Emirates Ministry of Climate Change and Environment. (2023). *Emirates Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action*. UAE Ministry of Climate Change and Environment. https://www.moccae.gov.ae/en/media-center/news/2023/11/uae-announces-emirates-declaration-on-sustainable-agriculture.aspx

UNDP. (n.d.). Quality Assurance Checklist for Revising Nationally Determined Contributions. Retrieved from https://climatepromise.undp.org/sites/default/files/research_report_document/undp-ndcsp-qa-checklist-ndc-revision-ENG.pdf. [Accessed 17 March 2025.]

UNEP. (2021). *Deforestation: Causes, effects and control strategies*. UNEP. https://wedocs.unep.org/bitstream/handle/20.500.11822/35851/DF.pdf

UNEP. (2023).Frontiers 2023. *What's Cooking? An assessment of the potential impacts of selected novel alternatives to conventional animal products*. UNEP. https://doi.org/10.59117/20500.11822/44236.

UNEP. (2024). *Food Waste Index Report 2024*. UNEP. https://www.unep.org/resources/publication/food-waste-index-report-2024

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., ... & Murray, C.J.L. (2019). Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet*, 393(10170), 447–492. https://doi.org/10.1016/S0140-6736(18)31788-4

Xu, X., Sharma, P., Shu, S. et al. (2021). Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods. *Nat Food* 2, 724–732. https://doi.org/10.1038/s43016-021-00358-x

Appendices

APPENDIX I: OUTLINED EVALUATION OF AREAS

All four categories are assessed on a 0–3 scale for a maximum possible rating of 12.

1. **Scope of Food Systems Coverage:** How comprehensively does the NDC's actions cover different stages of the food system?
    a. Stages: **production, food loss, processing, distribution, food consumption, food waste**
    b. Evaluation
        i. Strong = addressing all of these stages (3 points)
        ii. Medium = addressing at least production, food consumption, and either food loss or food waste (2 points)
        iii. Weak = not strong or medium (1 point)
        iv. Absent = no mention of any stage (0 points)

2. **Context-Specific Action:** To what extent does the NDC include actions that are most relevant to its context?
    a. Issue / applicable countries
        i. **Reducing food insecurity or malnutrition** / all but high-income countries (Appendix II)
        ii. **Mitigating emissions in food production** / high- and upper-middle-income countries (Appendix II)
        iii. **Reducing agricultural deforestation** / countries with highest agriculturally driven deforestation (Appendix III)
        iv. **Shifting from high-impact dietary patterns** / countries consuming ASFs ≥ 25% above EAT-Lancet levels (Appendix IV)
        v. **Reducing food loss and/or waste** / all countries
        vi. **Reducing fossil fuel use in the food system** / high-income and upper-middle-income countries
        vii. **Enhancing climate-resilient food production** / all countries
    b. Evaluation
        i. For each:
            1. Strong = concrete action (specific policy adopted; plan to adopt a specific policy, including conditionally based on finance; quantifiable target; time-bound target; or financial commitment)
            2. Medium = intent to take some action mentioned. This can include any of the following:
                a. an explicit policy direction or goal without a detailed implementation plan;
                b. a commitment to exploring policy options or developing a plan; or
                c. a mention of potential measures but without a timeline, quantifiable target, or financial commitment.
            3. Weak = only a descriptive mention (e.g., climate change as impacting food security)
            4. Absent = no mention
        ii. In aggregation:
            1. Strong (3 points):
                a. At least medium on all applicable subareas and strong on at least one applicable subarea
            2. Medium (2 points)
                a. Medium on all applicable subareas
                b. At least medium on more than half of applicable subareas
                c. Strong in two subareas, weak or absent in most other applicable subareas
            3. Weak (1 point)
                a. Weak or absent on more than half of applicable subareas but not entirely absent; not strong
            4. Absent (0 points)
                a. No mention of any applicable subareas

3. **Promoting Synergies and Avoiding Maladaptation:** To what extent does the NDC consider food systems synergies and interlinkages, conform to a One Health Approach, and avoid maladaptation?
    a. *Considerations of synergies and interlinkages*: Does the NDC mention any of the following either for food specifically or in a way that would apply to food systems?

i. Topics
    1. Nutrition
    2. One Health, animal health, and/or animal welfare
    3. Other health considerations
    4. Human rights
    5. Biodiversity, nature, and ecosystems
    6. Gender
    7. Small-scale producers (i.e., smallholder farmers, small-scale fishers, pastoralists)
ii. Evaluation
    1. 0.5 points for each topic mentioned (max 3).

b. *Risk of maladaptation*: Does the NDC contain any policies that involve high risks of maladaptation or negative impacts?
i. High-risk activities
    1. In all countries, regardless of income:
        a. Expansion of agricultural frontier
        b. Increasing production of crops primarily for nonfood uses (feed and energy)
        c. Increasing pesticide use
        d. Intensification measures that threaten the livelihood of small-scale farmers
        e. Increasing water consumption
    2. In high- and upper-middle-income countries only (Appendix II):
        a. Intensification of animal agriculture, expansion of animal agriculture subsectors
        b. Increasing consumption of particular animal products in a country that already exceeds EAT-Lancet levels for ASF consumption
        c. Increasing fertilizer usage
        d. Other
ii. Evaluation
    1. Subtract 1 point for each high-risk policy included that lacks appropriate measures to mitigate potential negative impacts associated with the policy type, or unless expert opinion indicates it is contextually necessary for achieving a critical policy objective with no less harmful alternatives
    2. The number of points subtracted from high-risk activities or policies *can equal but not exceed* the number of points gained for the synergistic topics mentioned.

c. Aggregation
i. Strong: 2.5–3 aggregated points in this section
ii. Medium: 1.5–2.5 aggregated points in this section
iii. Weak: 0.5–1.5 aggregated points in this section
iv. Very weak: <0.5 aggregated points in this section

4. Equity and Inclusiveness in NDC Development

a. *Equity*
i. Issues
    1. Equitable 1.5°C alignment
        a. According to Civil Society Equity Review
    2. Just transitions
        a. Includes inclusive, participatory, and/or democratic decision-making processes and/or economic policies that benefit those most impacted, such as subsidies for small/marginalized farmers, fair prices for crops, or livable wages for farmworkers and food chain workers
    3. Specific consideration of the needs of marginalized and/or vulnerable groups
        a. Includes women, youth, and Indigenous Peoples
    4. Financing
        a. For high-income countries (Appendix II): Does the NDC mention financing for developing countries?

ii. Equity Evaluation
    1. Strong (3 points) = all
    2. Medium (2 points) = 2 or 3
    3. Weak (1 point) = 1 issue addressed
    4. Absent (0 points) = no issues addressed

b. *Inclusiveness in NDC Development*
    i. Did the NDC development involve the following:
        1. multiple government ministries;
        2. departments and agencies of government;
        3. subnational bodies;
        4. the private sector;
        5. academia;
        6. civil society organizations;
        7. Indigenous Peoples; and/or
        8. other vulnerable/marginalized groups (e.g., women; youth; people of diverse gender identities and sexual orientations; ethnic, racial, religious, and linguistic minorities; persons with disabilities).
    ii. Inclusiveness Evaluation
        1. ½ point for each mentioned (maximum 3).
    iii. Averaging scores for *Equity and Inclusiveness in NDC Development*
        1. Score for this area:
            a. Strong: 2.25–3 points
            b. Medium: 1.25–2 points
            c. Weak: 0.25–1 points
            d. Absent: 0 points

APPENDIX II: COUNTRY CATEGORIES BY INCOME BRACKET

Source: World Bank 2025

High-income countries

American Samoa, Andorra, Antigua and Barbuda, Aruba, Australia, Austria, Bahamas, Bahrain, Barbados, Belgium, Bermuda, British Virgin Islands, Brunei Darussalam, Bulgaria, Canada, Cayman Islands, Channel Islands, Chile, Croatia, Curaçao, Cyprus, Czechia, Denmark, Estonia, Faroe Islands, Finland, France, French Polynesia, Germany, Gibraltar, Greece, Greenland, Guam, Guyana, Hong Kong SAR, Hungary, Iceland, Ireland, Isle of Man, Israel, Italy, Japan, Korea Rep., Kuwait, Latvia, Liechtenstein, Lithuania, Luxembourg, Macao SAR, Malta, Monaco, Nauru, Netherlands, New Caledonia, New Zealand, Northern Mariana Islands, Norway, Oman, Palau, Panama, Poland, Portugal, Puerto Rico, Qatar, Romania, Russian Federation, San Marino, Saudi Arabia, Seychelles, Singapore, Sint Maarten, Slovak Republic, Slovenia, Spain, St. Kitts and Nevis, St. Martin, Sweden, Switzerland, Taiwan, Trinidad and Tobago, Turks and Caicos Islands, United Arab Emirates, United Kingdom, United States, Uruguay, Virgin Islands (U.S.)

Upper-middle-income countries

Albania, Algeria, Argentina, Armenia, Azerbaijan, Belarus, Belize, Bosnia and Herzegovina, Botswana, Brazil, China, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Equatorial Guinea, Fiji, Gabon, Georgia, Grenada, Guatemala, Indonesia, Iran, Iraq, Jamaica, Kazakhstan, Kosovo, Libya, Malaysia, Maldives, Marshall Islands, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Namibia, North Macedonia, Paraguay, Peru, Serbia, South Africa, St. Lucia, St. Vincent and the Grenadines, Suriname, Thailand, Tonga, Türkiye, Turkmenistan, Tuvalu, Ukraine, Venezuela

Lower-middle-income countries

Angola, Bangladesh, Benin, Bhutan, Bolivia, Cabo Verde, Cambodia, Cameroon, Comoros, Congo Rep., Côte d'Ivoire, Djibouti, Egypt, Eswatini, Ghana, Guinea, Haiti, Honduras, India, Jordan, Kenya, Kiribati, Kyrgyz Republic, Lao PDR, Lebanon, Lesotho, Mauritania, Micronesia, Morocco, Myanmar, Nepal, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Philippines, Samoa, São Tomé and Príncipe, Senegal, Solomon Islands, Sri Lanka, Tajikistan, Tanzania, Timor-Leste, Tunisia, Uzbekistan, Vanuatu, Vietnam, West Bank and Gaza, Zambia, Zimbabwe

Low-income countries

Afghanistan, Burkina Faso, Burundi, Central African Republic, Chad, Congo Dem. Rep., Eritrea, Ethiopia, Gambia, Guinea-Bissau, Korea Dem. People's Rep., Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Rwanda, Sierra Leone, Somalia, South Sudan, Sudan, Syrian Arab Republic, Togo, Uganda, Yemen

APPENDIX III: COUNTRIES WITH HIGH RATES OF DEFORESTATION FROM FOOD SYSTEM EXPANSION

Global Forest Watch (Hansen et al. 2013) data was used to rank the 25 countries with the highest rates of deforestation from "commodities" or "shifting agriculture" during 2019–2023. The Excel spreadsheet containing this analysis can be viewed here. The list of countries to be considered for this subarea as follows:

Angola, Argentina, Bolivia, Brazil, Cambodia, Cameroon, Colombia, Côte d'Ivoire, Democratic Republic of the Congo, Ghana, Guinea, Indonesia, Laos, Liberia, Madagascar, Malaysia, Mexico, Mozambique, Myanmar, Paraguay, Peru, Sierra Leone, Tanzania, Venezuela, and Zambia

APPENDIX IV: COUNTRIES WITH HIGH-IMPACT DIETS

Countries were considered to have high-impact diets if their consumption of animal-sourced foods (ASFs) exceeded healthy levels of consumption. First, food supply (measured in kilocalories per capita per day) data for each food group during 2017–2022 was acquired from FAOStat Food Balances data (FAO 2024). Each category of animal-sourced food was summed and compared to the sum of EAT-Lancet's recommended levels of consumption of all ASFs. If supply of ASFs for a particular country exceeds 125% of healthy ASF consumption, that country (among those listed below) will be evaluated by this subarea (supply plus an additional margin is used as a proxy for consumption). The Excel spreadsheet containing this analysis can be viewed here. The list of countries considered to excessively consume ASFs are as follows:

Albania, Algeria, Antigua and Barbuda, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belarus, Belgium, Belize, Bolivia (Plurinational State of), Bosnia and Herzegovina, Brazil, Bulgaria, Cabo Verde, Canada, Chile, China, China (Hong Kong SAR), China (Macao SAR), China (mainland), China (Taiwan Province of), Colombia, Costa Rica, Croatia, Cuba, Cyprus, Czechia, Denmark, Dominica, Dominican Republic, Ecuador, El Salvador, Estonia, Fiji, Finland, France, French Polynesia, Gabon, Georgia, Germany, Greece, Grenada, Guyana, Hungary, Iceland, Ireland, Israel, Italy, Jamaica, Japan, Kazakhstan, Kiribati, Kuwait, Kyrgyzstan, Latvia, Lebanon, Libya, Lithuania, Luxembourg, Malaysia, Maldives, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia (Federated States of), Mongolia, Montenegro, Nauru, Netherlands (Kingdom of the), New Caledonia, New Zealand, Nicaragua, North Macedonia, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Poland, Portugal, Qatar, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Saudi Arabia, Serbia, Seychelles, Slovakia, Slovenia, South Africa, South Sudan, Spain, Suriname, Sweden, Switzerland, Tajikistan, Tonga, Trinidad and Tobago, Tunisia, Türkiye, Turkmenistan, Tuvalu, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay, Uzbekistan, and Viet Nam.

Note that summing each EAT-Lancet ASF category overlooks some of the nutritional nuances in EAT-Lancet's recommendations but generally categorizes countries appropriately for the purposes of this scorecard.