Info Note

Livestock management ambition in the new and updated nationally determined contributions: 2020-2022

Analysis of agricultural sub-sectors in national climate change strategies

Sabrina Rose, Arun Khatri-Chhetri, Kyle M. Dittmer, Milena Stier, Andreas Wilkes, Sadie Shelton, Claudia Arndt, Eva Wollenberg

OCTOBER 2022

Key messages

- The share of countries with livestock measures in new and updated NDCs has not significantly changed since the previous round of NDCs.
- 36% of countries included livestock mitigation measures in new and updated NDCs (59 of 164 countries) compared to 35% in the previous NDCs (68 of 192 countries).
- 39% of countries included livestock adaptation measures in new and updated NDCs (64 of 164 countries) compared to 35% in the previous NDCs (67 of 192 countries).
- Mitigation priorities included manure management (20% of 164 countries), feed management (16%) and silvopastoralism (10%). Adaptation priorities included breed management (16%), feed management (10%) and silvopastoralism (10%).
- Among the top 10 countries with the highest mitigation potential for enteric fermentation and manure management, 7 had livestock mitigation measures.
- Only twelve countries included GHG targets for livestock, but 30 countries have relevant livestock mitigation measures aligned with the Global Methane Pledge.
- Specification of sub-sector actions in NDCs can improve eligibility for climate finance, but this level of detail can reduce countries' flexibility for meeting their NDC targets and countries often lack affordable, robust monitoring, reporting, and verification (MRV) systems.
- Livestock commitments that demonstrated high standards, which may indicate options for other countries, included quantified outcomes, reference levels of indicators, mitigation potentials, and policies.

The livestock sector is an important source of food and income security for a large share of the global population and is responsible for approximately 60 percent of food production emissions (Xu et al. 2021). Transparent commitments to climate change mitigation and adaptation in the livestock sub-sector are critical for tracking progress toward global climate targets. As of September 30, 2022, 88 countries included livestock in mitigation or adaptation contributions in their new and updated nationally determined contributions (NDCs). Seven of the top ten countries with the highest mitigation potential for enteric fermentation and manure management included livestock mitigation measures (policies or actions) in their NDCs.

To better understand the role of the livestock sub-sector in the new and updated NDCs, we evaluated livestock commitments in the new and updated NDCs. We evaluated progress and ambition since the previous NDCs,[1] assessed ambition among countries with the highest mitigation potential for livestock, highlighted examples of domestic policies for implementation, and summarized needs for implementation support. We report here on these results and conclude with recommendations on how to enhance ambition and improve transparency in the NDCs, while recognizing the challenges countries face. The analysis aims to enhance the information necessary for clarity, transparency and understanding (CTU) of NDCs by identifying gaps in targets, finance needs and policy.

Progress and ambition in livestock management

As of September 30, 2022, 164 countries (137 Parties including the EU) submitted new or updated NDCs to the

[1] Previous NDCs include 190 I/NDCs submitted as of November 24, 2019, Turkey's first NDC submitted on October 11, 2021, and Iraq's first NDC submitted on October 15, 2021, for a total of 192 NDCs. EU countries are counted individually. The analysis of livestock in previous NDCs is based on Richards et al. (2016).

CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security CCAFS

UNFCCC.[2] Of these, 88 countries referred to livestock, representing 54 percent of new or updated NDCs. In the previous round of NDCs based on an analysis by Richards et al. (2016), 108 countries included livestock in mitigation or adaptation contributions (56 percent of countries). Thirty countries included livestock for the first time since the previous round of NDCs.[3]

In the new or updated NDCs, 59 countries included livestock in mitigation contributions, and 64 included livestock in adaptation contributions. Manure management was prioritized in mitigation contributions (33 countries) and breed management was prioritized in adaptation contributions (27) (see Table 1).

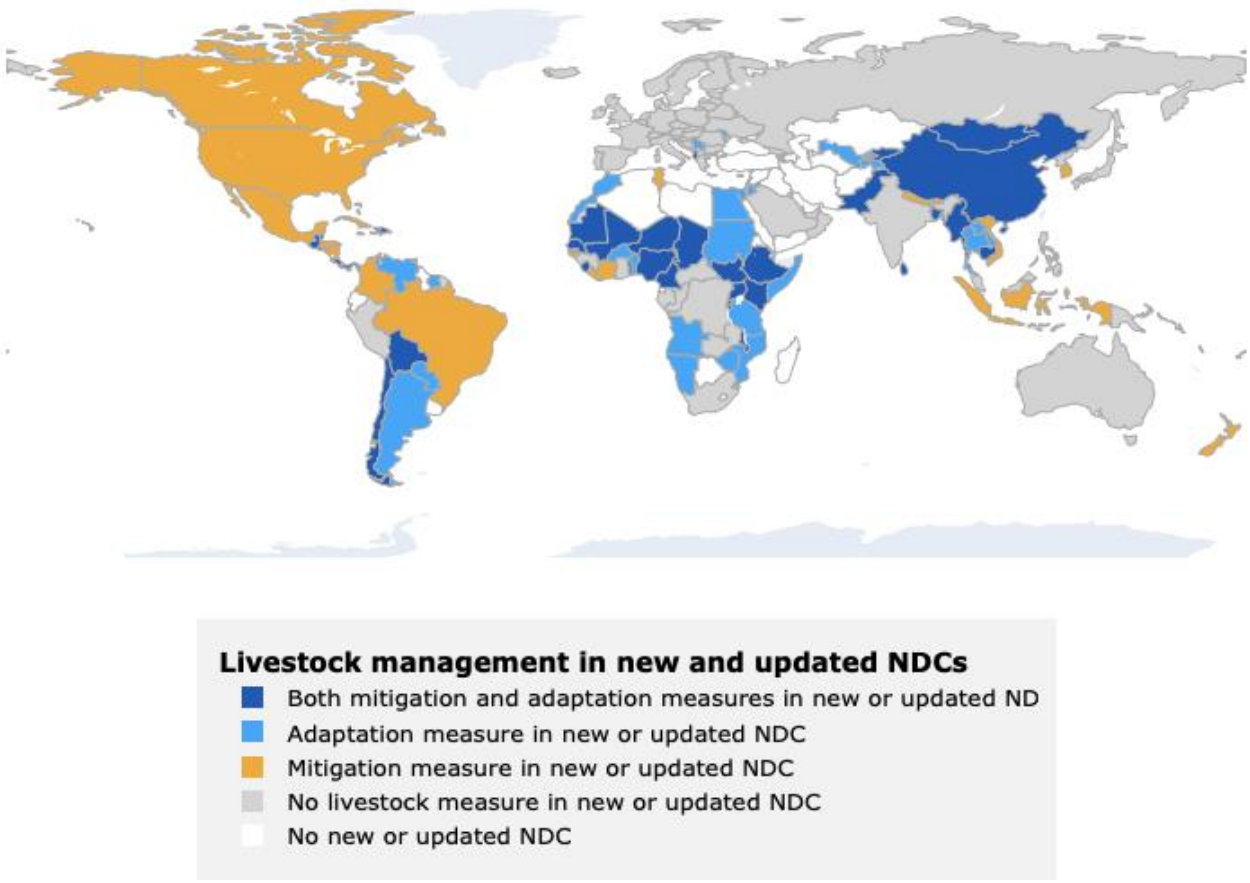

***Figure 1**. Map of countries with livestock measures in new and updated NDCs*

***Table 1**. Summary of livestock measures in new and updated NDCs*

Measure	Mitigation measures (No. of countries)	Adaptation measures (No. of countries)	Mitigation or adaptation measures (No. of countries)
Livestock (general references to sub-sector)	25	29	44
Animal health	3	15	17
Breed management	8	27	31
Feed management	26	16	37
Herd composition management	8	5	11
Manure management	33	6	38
Silvopastoralism	17	16	27

Note: EU countries are included in counts individually (i.e., as 27 countries).

This analysis focuses on specification of the livestock-related commitments in the NDCs as a measure of transparency. Countries that included livestock implicitly within economy-wide or sectoral measures (e.g., agriculture, energy) in the new or updated NDC are not accounted for in this analysis.

[2] Parties with time frames up to 2025 in their intended nationally determined contribution (INDC) were requested to communicate a *new* NDC. Parties with time frames up to 2030 in their INDC were requested to communicate an *updated* NDC (UNFCCC 2021).

[3] Albania, Armenia, Cambodia, Canada, China, Cuba, Dominica, Dominican Republic, El Salvador, Fiji, Guatemala, Haiti, Honduras, Jamaica, Republic of Korea, Kyrgyzstan, Mauritania, Mauritius, New Zealand, Panama, Paraguay, Saint Kitts and Nevis, Saint Lucia, Samoa, Serbia, Suriname, Tajikistan, Thailand, United States of America, Uzbekistan

Similar to the previous NDCs, livestock commitments ranged from broad, qualitative measures (including policies) to GHG targets, defined as commitments to reduce emissions by a specified amount and timeline. Only twelve countries included GHG targets for livestock (Belize, Burundi, Côte d'Ivoire, Cuba, Guatemala, Kyrgyzstan, Liberia, Mongolia, New Zealand,[4] Serbia, South Sudan, and Uganda). Where specified, emission reductions ranged from 3% to 40%. Specifying livestock-related policies and non-GHG actions in NDCs may provide flexibility for countries that cannot track GHG impacts of livestock-related measures but can track policies and actions. Thirty countries included measures with quantified indicators (with or without clear timelines) for livestock in the new and updated NDCs, 25 of which included measures with quantified indicators for the first time.[5] Twenty-two countries included measures with quantified indicators in non-GHG units (19 in mitigation contributions, 8 in adaptation contributions). Some countries also reported mitigation potentials of livestock measures but did not necessarily commit to reduce emissions by the estimated amount. Table 2 provides examples of livestock GHG targets, and Table 3 provides examples of measures with indicators in non-GHG units.

Many countries did not specify animal types within their livestock commitments. Where animal types were specified, measures related to cattle were most common. Fewer countries specified measures for non-ruminant animals. For example, China included a manure management measure for livestock and poultry in its updated NDC.

The majority of livestock measures in NDCs involved actions within the farmgate. Other aspects of livestock value chains, such as land use change and consumption, were not often discussed as actions related to the livestock sector. However, grassland commitments were sometimes linked to the livestock sub-sector.[6] For example, Pakistan included an adaptation measure to adopt sustainable grassland management in livestock production systems. Additionally, crop-related mitigation and adaptation commitments can affect the production of feed in livestock value chains, but this link was not typically described in NDCs.

On the demand-side, diet-related measures were uncommon in the new and updated NDCs. For example, Ethiopia included a mitigation commitment related to animal-based diets: "Replacing non-dairy cattle stock with chickens (supply side) and inducing a demand shift from beef to chicken".

***Table 2**. Examples of livestock GHG targets in new and updated NDCs*

Country	Mitigation or adaptation	Measure	Conditionality	Commitment	Changes between previous and new or updated NDC
Belize	Mitigation	Livestock (general reference)	Conditional	"Reduce methane emissions from livestock by 10% by 2030 and avoid emissions of at least 4.5 kt CO_2e related to agriculturally driven land use change by 2025"	■ Added livestock GHG target
Burundi	Mitigation	Feed management	Conditional	"Improve the composition of feed for livestock by adopting agro-sylvo-zootechnical integration systems." GHG impact of action: "Reduce methane emissions from enteric fermentation by 3% in 2025 and 2030 from 2015" (translated)	■ Added livestock GHG target ■ Increased transparency by adding greenhouse gas emission reductions, costs and assumptions
Cuba	Mitigation	Manure management	Mix of conditional and unconditional	"Treatment of 100% of waste waters in the Cuban swine sector, reducing 8 million ktCO_2eq. in emissions annually in the period of 2020-2030."	■ Added livestock GHG target ■ Increased transparency by adding greenhouse gas emission reductions, reference values, and other indicators
Mongolia	Mitigation	Manure management, herd composition	Unconditional	"Regulate and reduce the livestock number, Improve the livestock manure management" for total emission reductions of 5,283.3 kt CO_2e by 2030	■ Maintained the same livestock mitigation measure ■ Increased transparency by adding estimated greenhouse gas emission reductions

[4] New Zealand's target refers to biogenic methane, which includes livestock and waste sectors.

[5] Albania, Belize, Bhutan, Burundi, Cambodia, Colombia, Costa Rica, Cuba, El Salvador, Ethiopia, Guatemala, Guinea-Bissau, Haiti, Kyrgyzstan, Liberia, Mauritania, Mongolia, Nepal, New Zealand, Niger, Panama, Rwanda, Serbia, South Sudan, Sri Lanka

[6] Grassland commitments intended to enhance soil organic carbon sequestration are described in CCAFS' analysis of soil carbon in new and updated NDCs (Rose et al. 2021).

***Table 3**. Examples of livestock commitments with quantified indicators in non-GHG units in new and updated NDCs*

Country	Mitigation or adaptation	Measure	Conditionality	Commitment	Changes between previous and new or updated NDC
Ethiopia	Adaptation	Herd composition	Not specified	"Diversify livestock and animal mix, including promotion of poultry and small ruminants." Indicators: Percentage of improved livestock, productivity of poultry and small ruminants in tons.	■ Added quantified livestock adaptation measures
Sri Lanka	Mitigation	Animal health, feed management, herd composition	Mix of conditional and unconditional	"Improve dairy sector productivity by managing herd, herd health, feed and by improving animal comfort and welfare (40% increase of milk yield per cattle by 2030 on unconditional basis and further increase up to 55% on conditional basis. Increase productive milking cow percentage of the herd up to 40% on conditional basis)."	■ Added quantified livestock mitigation measures

***Table 4.** Livestock mitigation commitments of countries with high livestock mitigation potential from enteric fermentation and manure management (top ten listed in order from highest to lowest)*

Country	Sector Coverage	Cost-effective mitigation potential, enteric fermentation & manure (Mt CO_2e per year) (Roe et al. 2021)	Livestock mitigation specified in new or updated NDC	Changes between previous and new or updated NDC
United States	Economy-wide	61.2	Yes*	**Improved livestock commitments**: ■ Added practices: rotational grazing, manure management
China	Not specified	30.2	Yes*	**Improved livestock commitments:** ■ Added manure management of livestock and poultry
India	Economy-wide	9.9	No	None
Brazil	Economy-wide	8.8	Yes	**Improved financial transparency of livestock commitments but removed quantified non-GHG measures**: ■ Specified investment ■ Maintained reference to crop-livestock-forestry integration ■ Removed quantified agroforestry measures (but continued to include these measures in domestic policy)
Nigeria	Economy-wide	4.7	Yes	**No sub-sector level change**: ■ Maintained the same examples of mitigation actions for livestock (agroforestry, feed management, breed management)
Bangladesh	Economy-wide	4.1	Yes	**Improved livestock commitments**: ■ Added practices: feed improvement, manure management (biogas), training programmes ■ Changed actions from conditional only to a mix of conditional and unconditional ■ Added cost estimates for livestock mitigation measures ■ Continued to include quantified non-GHG outcomes
Australia	Economy-wide	3.1	No	None
Canada	Economy-wide	2.7	Yes*	**Improved livestock commitments**: ■ Added references to livestock management ■ Added practices: rotational grazing, manure management ■ Specified investment
New Zealand	Economy-wide	2.6	Refers to biogenic methane	**Changed livestock-related commitments**: ■ Added target to reduce biogenic methane emissions (covering agriculture and waste), but intended emission reductions from livestock only are not specified in the NDC
Spain (EU)	Economy-wide	2.5	No	None

* Indicates livestock mitigation was specified for the first time in new or updated NDCs

Box 1. Policy coherence and implementation challenges in Kenya

Analysis of Kenya's policies indicates relatively strong coherence among climate change, agriculture and livestock policies. Both adaptation and mitigation components of Kenya's initial NDC (2016) are based on the *National Climate Change Action Plan* (NCCAP) and agriculture sector priorities are aligned with the *Kenya Climate Smart Agriculture Implementation Framework* (KCSAIF). KCSAIF sets out generic actions in line with livestock development priorities. The updated NDC (2020) continues to align agricultural mitigation actions with KCSAIF "with emphasis to efficient livestock management systems." The background to this statement includes the Kenya Dairy NAMA, a proposed $250 million investment targeting 15% of dairy cattle in Kenya with an estimated mitigation potential of 8.8 Mt CO_2e over a 10-year period. This was the only agriculture sector mitigation action explicitly listed in Kenya's NCCAP, as insufficient evidence was available for other agricultural mitigation options. Increasing livestock productivity is also a priority in the *Agriculture Sector Growth and Transformation Strategy* and *National Agriculture Investment Plan*.

Under Kenya's constitution, agriculture is a function devolved to county governments, while climate change as a national issue is coordinated by national agencies. Devolution has major implications for national government's ability to implement national policies. Integrating both livestock and climate-smart agriculture in County Integrated Development Plans – the basis for allocating all public funds – remains a priority. Challenges being addressed include increasing county government and other stakeholders' understanding of climate smart livestock options and their capacities to plan and implement effective actions and leveraging climate smart investments from the private sector. County Climate Change Funds are one mechanism being explored to support county governments to plan and implement local climate actions, including in the livestock sector.

Alignment between mitigation ambition and mitigation potential

Ten countries contribute about 68% of global cost-effective mitigation potential from enteric fermentation and manure management (Roe et al. 2021).[7] Only 7 of the top 10 countries with the highest mitigation potential for enteric fermentation and manure management included measures for the livestock sub-sector in mitigation contributions of new or updated NDCs (see Table 4).

The specificity and ambition of livestock mitigation commitments in new or updated NDCs varies even among the top 10 countries with the highest mitigation potentials for this sub-sector. Only Bangladesh included mitigation measures with quantified non-GHG indicators explicitly for livestock. New Zealand included an emission reduction target for biogenic methane. Other countries mentioned mitigation practices without GHG targets (measures with clear timelines and specific GHG goals).

NDCs do not necessarily reflect a country's domestic policies or measures and should not be used as an indicator in this way. NDCs may provide an overview of countries' climate commitments whereas supporting policies or technical documents may contain details on targets, costs, or other information. Australia and the European Union did not explicitly refer to livestock in their NDCs, but both Parties have domestic policies to support climate action in the livestock sub-sector. Countries that have domestic policies related to livestock could improve transparency of their actions by describing how these policies contribute to livestock mitigation or adaptation in their NDCs.

Policies for NDC implementation

The livestock sector is typically governed by agricultural sector policies, often with an emphasis on economic growth in developing countries. Some countries referred to livestock sub-sector policies in their NDCs (e.g., Zimbabwe Livestock Growth Implementation Plan, Ethiopia's Livestock Master Plan, Cambodia's Strategic Planning Framework for Livestock Development 2016-2025). Climate change policies present additional priorities within the framework of livestock-related policies. Greater coherence among climate change and livestock policies is necessary to support NDC implementation. Box 1 describes an example of policy coherence in Kenya along with implementation challenges.

Means of implementation

Finance: Twelve countries reported finance needs for livestock measures in their new and updated NDCs, ranging from 0.1 million USD to approximately 2.5 billion USD from domestic or international sources (see Figure 2). The majority of countries specified finance for mitigation measures and measures conditional on international support. While more cost estimates were provided at the sub-sector level in new and updated NDCs relative to previous NDCs, many estimates are still only reported in aggregate for the agriculture sector. Figure 2 presents finance needed for livestock measures, where reported. It does not include needs that may be aggregated across the agriculture sector or multiple sub-

[7] Roe et al. (2020) estimated cost-effective mitigation potentials (at or up to $100/ton CO_2e) for avoided CH_4 emissions from enteric fermentation and avoided CH_4 and N_2O emissions from manure management based on Beach et al. (2015) and U.S. EPA (2019). Avoided emissions from enteric fermentation assumed adoption of improved feed, antibiotics, bovine somatotropin, propionate precursors, antimethanogens, and intensive grazing among intensively managed livestock. Avoided emissions from manure management assumes adoption of anaerobic digesters among intensively managed production systems of dairy cattle and pigs.

sectors. As such, the data presented in Figure 2 are not representative of all measures related to livestock in NDCs.

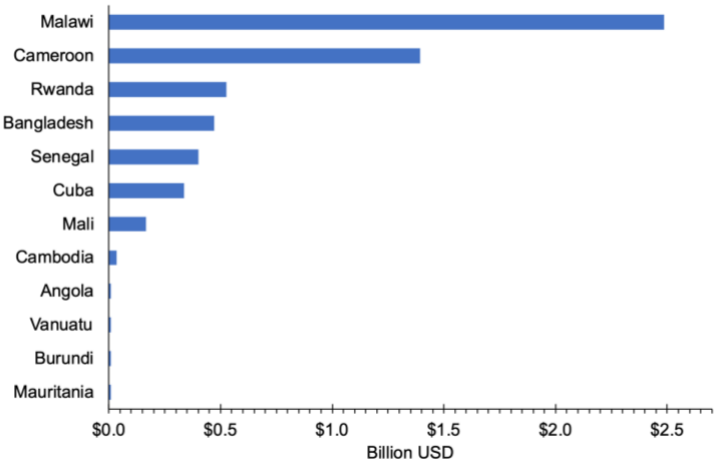

***Figure 2**. Finance needed for livestock commitments in the new and updated NDCs (Billion USD)*

Capacity Building: Most capacity building needs were presented as crosscutting needs that are not specific to agricultural sub-sectors. Some countries mentioned capacity building needs related to the livestock sector, such as data collection, MRV, and agricultural research and development for improved breeds.

Technology Transfer: Technology transfer needs were often discussed at the sector level; however, some countries mentioned specific needs for livestock. For example, Suriname indicated a need for technologies for climate-resilient breeds. Thailand also identified improved livestock varieties and management systems as technology needs. Malawi listed integrated crop-livestock-aquaculture-forestry systems as its second priority technology need for adaptation behind land restoration.

Social considerations

Countries often referenced crosscutting policies or priorities related to social inclusion in their new and updated NDCs. In the context of livestock measures, at least 11 countries refer to the role of women, youth, indigenous or local communities.

For example, Tanzania and Somalia plan to promote traditional and local knowledge in addition to modern knowledge for sustainable pasture management. South Sudan and Guinea included sustainable livestock management and pasture management, respectively, to help address issues of resource availability and conflict affecting pastoral communities. Cambodia and Nigeria noted the importance of women's roles and engagement in animal husbandry. Cambodia also plans to engage youth in research and development for breeding and feeding technologies. Social inclusion is more often described as part of adaptation measures, despite the relevance of inclusion for mitigation measures as well.

Transparency challenges

Ambitious sub-sector action can attract finance and guide implementation. However, countries may prefer to maintain flexibility in how they plan to achieve their sector-level or economy-wide targets rather than commit to sub-sector actions. Sub-sector action may also be challenging to track, particularly for countries without robust MRV systems.

For some countries, limited data availability is a constraint to including livestock in NDCs. For example, Zimbabwe did not include livestock mitigation measures in its updated NDC due to a lack of data to estimate emission reductions. Open source, cost-effective accounting systems can help countries demonstrate greater ambition and track progress towards long-term goals.

Conclusions and recommendations

The share of countries including livestock in the new or updated NDCs has not significantly changed; however, the transparency of livestock commitments has improved for some countries. Livestock is not prioritized among all countries with the highest mitigation potentials. Some countries with the highest ambition for livestock have improved their inclusion of this sub-sector by providing more practices, quantified information on outcomes, and mitigation potentials. However, data gaps still exist and constrain further inclusion of livestock measures in NDCs. The following items can help address transparency issues and raise ambition for livestock:

- Descriptions of enhanced policies that contribute to livestock mitigation or adaptation in NDCs
- Increased capacity building and finance to support data collection
- Concrete short-term and long-term plans to establish MRV systems
- Finance and technology transfer to support MRV systems
- Research and development of low-cost, reliable indicators for mitigation and adaptation actions

These priorities can help countries raise ambition of livestock commitments and more transparently track progress towards the goals of the Paris Agreement.

Other NDC research

- Briefs, maps & data: Agriculture's prominence in the INDCs: data and maps (2016)
- Weise L, et al. 2021. Countries' commitments to soil organic carbon in Nationally Determined Contributions. *Climate Policy.*
- Weise et al. 2019. Enhancing Nationally Determined Contribution (NDC) ambition for soil organic carbon protection and sequestration. CCAFS Info Note.

Further reading

- Roe S, Streck C, Beach R, Busch J, Chapman M, Daioglou V, et al. 2021. Land-based measures to mitigate climate change: Potential and feasibility by country. *Global Change Biology*, 1– 34.
- Tubiello F, Rosenzweig C, Conchedda G, Karl K, Gütschow J, et al. 2021. Greenhouse gas emissions from food systems: building the evidence base. *Environmental Research Letters*.
- UNFCCC. 2021. Nationally determined contributions under the Paris Agreement. Synthesis report by the secretariat. FCCC/PA/CMA/2021/8/Rev.1. (25 October).
- Xu X, Sharma P, Shu S. et al. 2021. Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods. *Nature Food,* 2**,** 724–732.

This series of briefs summarizes findings on livestock from an analysis of the nationally determined contributions to the Paris Agreement submitted between 2020-September 2022. This brief is one of a series on this analysis. The other Info Notes focus on the NDC's inclusion of soil organic carbon and rice and policies related to soil organic carbon commitments in NDCs for Brazil and Rwanda. This work was conducted as part of the CCAFS Low-Emissions Development Flagship.

***Sabrina Rose** (s.rose@cgiar.org) is a Policy Consultant for the CCAFS Low-Emissions Development Flagship*

***Arun Khatri-Chhetri** was a Science Officer for the CCAFS Low-Emissions Development Flagship*

***Milena Stier** is a Research Assistant for the CCAFS Low-Emissions Development Flagship*

***Kyle Dittmer,** Research Analyst, for CCAFS Low-Emissions Development Flagship*

***Andreas Wilkes** is the Director of Values for Development, Ltd.*

***Sadie Shelton** is a Communications Officer for CCAFS Low-Emissions Development Flagship*

***Claudia Arndt** is a Senior Scientist at ILRI and the Co-Team Leader of the Mazingira Centre*

***Eva Wollenberg** is the Flagship Leader for CCAFS Low-Emissions Development*

Please cite:
Rose S, Khatri-Chhetri A, Dittmer K, Stier M, Wilkes A, Shelton S, Arndt C, Wollenberg E. 2020. Livestock management ambition in the new and updated nationally determined contributions: 2020-September 2022: Analysis of agricultural sub-sectors in countries' climate change strategies. Updated October 2022. CCAFS Info Note. Wageningen, The Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

This brief was updated March 2022, and October 15, 2022.

About CCAFS Info Notes

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) brings together some of the world's best researchers in agricultural science, development research, climate science and Earth system science, to identify and address the most important interactions, synergies and tradeoffs between climate change, agriculture and food security. Visit us online at **https://ccafs.cgiar.org**.

CCAFS is led by the International Center for Tropical Agriculture (CIAT) and supported by: