AGRICULTURE INITIATIVE

PROGRESS REPORT 2016-2017

LEAD PARTNERS
Bangladesh, Canada, European Commission (EC), Food and Agriculture Organization of the United Nations (FAO), Ghana, International Cryosphere Climate Initiative (ICCI), Japan, New Zealand, Nigeria, United States, World Bank

IMPLEMENTERS
Center for Tropical Agricultural Research and Education (CATIE), Dienst Landbouwkundig Onderzoek (DLO), Food and Agriculture Organization (FAO) of the United Nations, International Center for Tropical Agriculture (CIAT), International Cryosphere Climate Initiative (ICCI), International Livestock Research Institute (ILRI), International Rice Research Institute (IRRI), New Zealand Agricultural Greenhouse Gas Research Centre (NZAGGRC), Punjab Agricultural Management & Extension Training Institute (PAMETI), Stockholm Environment Institute (SEI)

TOTAL BUDGET FROM THE COALITION: $6,545,227
TOTAL EXPENDITURES FROM THE COALITION: $4,026,354
TOTAL FUNDS LEVERAGED: $464.4 million

NOTE

This document presents results from the Climate & Clean Air Coalition's Agriculture Initiative reported between July 2016 and June 2017. These results were recorded using the Demonstrating Impacts indicators, which have been approved by partners as the "common currency" to monitor and communicate impacts across the Coalition's initiatives and workstreams[1].

Presented achievements are the result of collaborations between multiple stakeholders, including national governments and cities, international organisations, NGOs, research institutions and the private sector. Some are a direct result of activities funded or co-funded by the Coalition, while others are indirect achievements in which the Coalition's actions played a catalysing role.

[1] The latest version of the Demonstrating Impacts Framework is accessible to partners here where the online tool to report new results is also accessible and open throughout the year.

DEMONSTRATING IMPACTS SUMMARY

OUTPUTS	
14 KNOWLEDGE RESOURCES AND TOOLS	The initiative supported the publication of assessments of potential mitigation packages in the livestock sector in six countries, namely Argentina, Bangladesh, Ethiopia, Kenya, Uruguay, Sri Lanka. It also worked on two scientific articles, on methane and nitrous oxide mitigation through early drainage of paddy soils and on the impacts of open burning of rice straw on methane and nitrous oxide emissions A well as this of a number of guidelines and reports on Climate-Smart Agriculture: Alternate wetting and drying in irrigated rice, National Action Plans for Mitigation in Rice in the Philippines and Vietnam, Guidelines in measuring GHG emissions in paddy rice field in Viet Nam, lessons learned on Water Security Threats Demand in the Mekong River, Alternate Wetting and Drying Infographic, and a study on addressing enteric methane for food security and livelihoods which evaluates the potential for improving production while reducing enteric methane emission intensity from dairy and beef production.
6 POLITICAL OUTREACH EVENTS	The initiative supported the first stakeholder engagement workshop on NAMA formulation in support of NDC implementation in the rice sector of Viet Nam, which brought together 22 stakeholders from the sector. In addition, participants in the initiative contributed to five international events in France and the United States to raise awareness about soil building/carbon sequestering research and practices.
1,690 PERSON-DAYS OF TRAINING	The initiative delivered trainings to over 3,000 participants from Bangladesh through a series of training events on alternate wetting and drying and methane measurement in rice fields. It also trained over three months, two Vietnamese students on paddy rice methane emissions-related research.
$67,000 OF CO-FUNDING	In order to support the ongoing work of the CCAC paddy rice component in Viet Nam and Bangladesh, and building on the CCAC suitability maps developed, a USAID feasibility study was funded with the objective of assessing the feasibility of a range of low emissions development interventions including AWD and related AWD+ options.
OUTCOMES	
4 CITATIONS AND 366 READERS	The two scientific articles supported by the initiative already received respectively two citations and 168 readers and two citations and 198 readers.
1 MEDIA ARTICLE	The initiative project "National Action Plans for Mitigation in Rice: Comparative Assessment of Institutional Field Testing and Possible Entry Points for Intervention in the Philippines and Vietnam." was covered by the Philstar media.
30 STRENGTHENED INSTITUTIONS	Training to two PhD students from the Hue University and Nong Lam University in Vietnam led to new skills being applied on sampling, measurement, and analysis of methane emissions from paddy rice. Work with the Focal Area Forum in Bangladesh resulted in an increased number of farmers being trained on AWD+ practices while the Bangladesh Agricultural University has mainstreamed AWD technology considerations in its activities. In addition, capacity building activities to ministries of Agriculture Livestock

	and of Environment as well as other relevant stakeholders in Argentina, Bangladesh, Benin, Burkina Faso, Ethiopia, Kenya, Mali, Niger, Senegal, Sri Lanka, Tanzania, Uganda and Uruguay built new capacities , including availability of new scientific evidence to assess mitigation options for the livestock sector. Finally following its work with the initiative, IRRI was granted official membership to the Working Group for proposal preparations for the Green Climate Fund in the ministry of agriculture in Vietnam and through this new capacity will be able to support SLCP integration into future proposals.
$411,000 OF CATALYSED FUNDING	Participation of CCAFS helped the organisation raise $265,000 of funding were leveraged to continue CCAFS activities on low emission rice production in Viet Nam, including $40,000 from USAID to develop investment plans. In addition, a $146,000 BMZ project on scalable straw management options for improved farmer livelihoods, sustainability and low environmental footprint in rice-based production systems in Viet Nam and the Philippines has been secured with CCAC as a supporting partner.
2 POLICIES AND PLANS	Following the preparatory workshops supported by the initiative, Viet Nam developed its plan for implementation of the Intended Nationally Determined Contribution (INDC) for agriculture and rural development, including a specific section on low emission rice production detailing milestones for the country to reach its 2030 emissions reduction targets. A strategy to expand the SSG Andes group was also developed by Argentina, Bolivia, Chile, Ecuador, Peru for the group to provide more expertise and technical support to decrease local open burning.

NARRATIVE REPORT

SUMMARY

OPEN AGRICULTURAL BURNING

The Coalition supports the development of replicable and scalable "no burn" alternatives in the Eastern Himalayas and Andes regions, which are particularly sensitive to the warming effects of black carbon. It works with regional networks to promote alternative practices that are tailored to local environments and crops.

Coalition funded work for Phase II initiated in November 2016 and has resulted in:

- The establishment of Strategic Support Groups (SSGs) in the Andes and Himalayas region to provide targeted expertise and technical support to regional governments, farmer associations and others wishing to decrease burning, with outputs tailored to local realities.
- Launch of demonstration projects on alternatives to mitigate open burning in Huancayo, Peru and in Punjab, India.
- Updated satellite mapping of open burning for the Himalayas and Andes regions from Phase I scoping period

PADDY RICE

The Coalition supports countries and farmers to overcome the challenges of adopting sustainable rice production practices with the aim of reducing methane emissions, while maintaining, and often even improving, rice yields. The Coalition aims to promote AWD practices on a large scale. To achieve this objective, the Coalition supports activities that identify priority areas for AWD implementation and provide incentives, technical support mechanisms and enabling conditions to help farmers overcome barriers to new practices.

Coalition funded work for Phase II initiated in December 2016 and to date has resulted in:

- The identification of suitable areas for AWD implementation in Vietnam and Bangladesh
- The identification of large-scale agricultural development initiatives for the mainstreaming of AWD practices
- Awareness raising and knowledge dissemination to policy makers and farmers in Vietnam and Bangladesh in region on specific farmer-led sustainable dissemination approach for AWD and the establishment of agreed norm of technology dissemination

Nationally Appropriate Mitigation Actions (NAMAs) have picked up momentum in Southeast Asia, and there is a real opportunity to transfer lessons learned and to transfer knowledge on AWD+ to country NAMA formulation in support of country's National Determined Commitments (NDCs) for the rice sector.

ENTERIC FERMENTATION-

The Coalition is working to transform ruminant production systems, especially in developing regions, to increase productivity and reduce emissions of enteric methane per unit of animal product. Coalition Partners are working to

identify and disseminate innovative low-cost or no-cost solutions that can be packaged together to result in multiple benefits for farmers and producers in addition to reducing enteric methane emissions.

Coalition funded work for Phase I came to completed in March 2016, and has resulted in:

- Detailed baseline estimates of CH4 emissions from livestock systems in 13 countries (Uruguay, Argentina, Sri Lanka, Bangladesh, Ethiopia, Kenya, Uganda, Tanzania, Mali, Niger, Burkina Faso, Senegal, Benin) using the Global Livestock and Environment Assessment Model (GLEAM) and comprehensive locally-obtained data;
- Potential mitigation packages developed by local experts and assessed for both their ability to reduce GHG emissions and their cost effectiveness;
- Improved knowledge and awareness of mitigation potential among a *wide range of stakeholders*; and
- Built regional as well as intra-country networks that the second phase was able to build upon.

The Phase 2 project that was approved at the Working Group in April 2017 will contribute to mainstreaming methane mitigation into broader livestock investment, policies and development activities being undertaken by collaborating with large-scale livestock development programmes underway in Bangladesh and Ethiopia by the World Bank, and Uruguay by the Global Environment Facility (GEF).

HIGHLIGHTS

OPEN AGRICULTURAL BURNING

Open burning is a global problem that compromises agricultural productivity; with intensified regional climate impacts in cryosphere regions such as the Arctic, Andes and Himalayas through deposition of black carbon. Burning reduces soil organic matter content, increasing erosion and soil run-off, in addition to its negative air quality, health and climate impacts; but many alternatives to burning exist that increase crop yields, profits and food security. Many countries already have adopted these methods on a wide scale, and CCAC work in this sector aims to accelerate the no-burn transition process in regions with high sensitivity to burning, such as those close to glaciers and snow pack on which nearby communities rely for water.

In the 2017-18 project, three interlocking elements will work to mitigate open burning especially in the Andes and Himalayas regions. This work builds on the initial 2014-16 CCAC scoping project that identified the most important sources of burning and feasible alternatives in both regions. In the Himalayas, the main focus will be the important wheat-rice cropping system: the most consistent and large burning source identified in the CCAC scoping project. In the Andes, the project will focus more on small- and medium-sized farms with integrated livestock and crops. The goal is to demonstrate concrete alternatives, raise global consciousness on impacts, and by 2019 move this issue into the mainstream of agriculture, climate, and environment efforts. The International Cryosphere Climate Initiative (ICCI) facilitates the project, complementing existing efforts near the Arctic. The three interlocking project components are:

- **Policy, Expert Support and Strategic Planning:** Strategic Support Groups (SSGs), one in the Himalayas and one in the Andes, provide targeted expertise and technical support to regional governments, farmer associations and others wishing to decrease burning, with outputs tailored to local realities. The first Andes SSG took place in April 2017; the Himalayas SSG met in August. A highly experienced International Coordinator was hired in January after a global search process and is coordinating SSG work, as well as providing support for the start-up of the Catalyst Projects (below). In addition to technical support, the SSGs are key to policy support enabling governments to begin providing a combination of incentives, and regulatory measures aimed at decreasing this harmful practice.
- **Catalyst Projects: Agricultural Extension and Education:** Catalyst Projects began contracting procedures in two (and may eventually spread to six) proposed target countries, all of which have provided letters of intent to support cessation of open burning in a farmer-focused effort. CCAC direct support will take place in India (Punjab) and Peru. ICCI is very actively seeking co-financing for the projects designed in Bolivia, Ecuador, Pakistan and Nepal. The designated implementer for the India project is PAMETI (the Punjab State Agricultural Institute). In Peru, the process began for Co-implementers INIA (the Peruvian national agriculture institute) and CARE in the mountainous Huancayo region. Catalyst projects include agricultural extension services and support to communities; study tours and Field Days to demonstrate lessons learned; and policy development with local governments.
- **Monitoring and Demonstrating Impact:** Detailed weekly satellite monitoring of burning, coordinated by Michigan Technological University took place in India and Peru in spring 2017, and has been updated for the greater Himalayas and Andes regions covered by the 2014-16 scoping project, providing a continuous record of burning from 2003 through spring 2017 now available at www.openburningcryosphere.org. Work has begun with local implementers to conduct on-the-ground monitoring in coordination with satellite maps to better understand what crops are being burned, and why, engaging student volunteers and NGOs.

PADDY RICE PRODUCTION

The Paddy Rice Production component is led collectively by the International Rice Research Institute (IRRI), the International Center for Tropical Agriculture (CIAT), and the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). The effort aims to disseminate alternate wetting and drying (AWD) practices on a large scale to facilitate both more stable food supply and reduction in methane emissions.

The Paddy Rice project launched Phase 2 in December 2016 and builds upon Phase 1 of the project that ran from October 2014 – July 2016 in Colombia, Bangladesh and Vietnam. In the second phase, IRRI is partnering with key stakeholders in Bangladesh, Colombia, and Vietnam to provide technical assistance programs to identify suitable areas for AWD implementation, mainstream AWD practices into large-scale agricultural development initiatives, and support business case development finance.

The Paddy Rice project has had great success in facilitating dialogue with stakeholders in both Bangladesh and Colombia. In Bangladesh, working with Focal Area Network (FAN) consisting of national organizations and NGOs, by

conducting training of trainers and farmers on AWD+ [2]practices between December 2016 and April 2017 has created a promising foundation for achieving outreach in the country with a potential to reach 50,000 farmers. The FAN training sessions were provided to 35 new trainers and approximately 3000 farmers. In Colombia, the country's first workshop on rice NAMAs (Nationally Appropriate Mitigation Actions) with the Ministry of Environment and Sustainable Development, FEDEARROZ (national producers association) and implementers of the CCAC Paddy Project was held on 9 September 2016 to define the information needed for the NAMA. A similar workshop was held with Vietnamese stakeholders in Hanoi on 23 June 2017. Here, a team was formed to jointly push the mitigation agenda forward within the Ministry of Agriculture and Rural Development (MARD) as well as the Ministry of Planning and Investment.

The Paddy rice project was also successful in leveraging funding received by CCAC. This was achieved by working with CCAFS and USAID-funded initiatives to conduct technical and financial analysis for Vietnam to explore and support finance options. Ultimately, they were able to assist Vietnam in choosing the appropriate initiatives for their policy structure and geography. Funding was leveraged from CCAFS in the amount of $225,000 USD and $160,000 USD from the United States Agency for International Development (USAID).

Lastly, the 'Handbook for Measuring Greenhouse Gas Emissions in Rice Cultivation' was prepared by the International Energy Agency (IEA) for MARD with input from the International Rice Research Institute (IRRI), Winrock International, and SNV-Vietnam. This handbook provides MARD and users with the necessary knowledge and skills on the system of GHG measurement, reporting, and verification (MRV), leading to the establishment of a more accurate national GHG inventory in the country. This guidance can serve as support in the developments of mitigation activities that are aligned with Vietnam's NAMAs. This handbook was approved and endorsed by the Deputy Minister of MARD, Le Quoc Doanh on November 22, 2016.

ENTERIC FERMENTATION

The Enteric Fermentation component works to transform ruminant livestock systems by reducing emissions of enteric methane per unit of product, while increasing efficiency.

The 'Reducing Enteric Methane for Improving Food Security and Livelihoods' project, phase 1 of 2, was successfully completed in March 2017 in Uruguay, Argentina, Sri Lanka, Bangladesh, Ethiopia, Kenya, Uganda, Tanzania, Mali, Niger, Burkina Faso, Senegal, Benin. Phase 1 of the project created detailed baseline estimates of enteric methane emissions from livestock systems estimated using the Global Livestock and Environment Assessment Model (GLEAM) and comprehensive locally-obtained data, assisted local experts in developing potential mitigation packages that both reduce GHG emissions and reduce their cost, and formed a regional and intra-country network among a wide range of stakeholders. A number of communication materials were produced within the last year, including country reports for Bangladesh, Ethiopia, and Uruguay, and a video discussing the story of Uruguay's journey towards a low-carbon economy.

[2] AWD is a management practice in irrigated lowland rice that saves water and reduces methane emission while maintaining yields. When combined with management for nitrogen efficiency and organic matter, it is referred to as AWD+.

The CCAC agreed to a formal partnership with GRA on 6 September 2016, with the CCAC attending GRA Council meetings and the GRA being present at CCAC Working Group meetings. This partnership has enabled both organizations to work more closely together and identify further activities for collaboration, such as the joint side event at FAO conference in July 2017 on 'Partnering to Scale Up Climate Action by Countries in the Agricultural Sectors'.

FINANCE

The Agricultural Initiative had discussed in the past the need for a longer term Agriculture Sector Finance Strategy with the aim to exchange financing needs and priorities, identify barriers and create opportunities to support scaling-up of investments to address SLCPs in the agriculture sector. However an opportunity presented itself in the near term to focus on Open Burning to maximize the benefits of strategic funding. In 2016, a Latin American Task Force was created including Colombia, Mexico, Peru, Chile, Dominican Republic, Paraguay and Uruguay. Other participants include the Inter-American Development Bank, Clean Air Institute, and Swisscontact. The purpose of the task force is to support the development of a Regional Proposal to the Green Climate Fund (GCF) that would include nationally focused intervention areas including in open burning. ICCI is contributing technical and policy expertise to the drafting of a Concept Note to the Green Climate Fund which is intended to create a financing mechanism to support the transition of Latin American farmers in to no-burn equipment and methods through no-cost or low-cost loans (microfinancing). A search began for a consultant to carry out this work, with Terms of Reference drafted and circulated to potential partners. The GCF Concept Note is anticipated to be submitted to the GCF Board by the end of 2017.

CHALLENGES

LIVESTOCK MANURE MANAGEMENT

- The implementation period of the opportunities for practice change had a duration of one year, which resulted in a challenge because it did not allow enough time for implementers to capture the project impacts.
- There are few countries who have the political will and/or Ministers who support the work.
- Limited country technical and financial support to sustain the project beyond CCAC support.
- Lack of emissions reduction quantification.

OPEN AGRICULTURAL BURNING

- Identifying co-financing for additional countries has proven difficult with two applications thus far: one unsuccessful due to a different crop focus, and one in-process.
- Overcoming the belief that "farmers will always burn," even among some agriculture experts presents a persistent difficulty, despite the spread of these methods in major world regions.

- Open burning remains under-appreciated as a practice that impacts climate and crop yields, a barrier to raising the profile of this work, including how it fits into countries' broader national climate change and development goals such as NDCs/NAMAs/SDGs.

PADDY RICE

- In Bangladesh, difficulty in re-engaging development partners due to personnel changes on the counterpart.
- Collaboration between different ministries (e.g., Agriculture, Environment and Finance) is often limited.
- Monitoring of AWD+ impacts on greenhouse gases is limited by lack of availability in reliable low-cost monitoring methods. Water sensor has been developed but further cost reduction seems necessary for practical and large scale introduction.

ENTERIC FERMENTATION

- Overcoming the narrative that livestock farming in developing countries requires a choice between improving livelihoods and strengthening food security or improving environmental considerations such as greenhouse gas emission reductions.
- The perception of the importance of this work, and how it fits in with individual countries' broader national climate change and economic development goals such as NDCs/NAMAs.

LESSONS LEARNED

OPEN AGRICULTURAL BURNING

- Completed mapping shows that burning remains persistent and in some cases, such as Chile in early 2017, even has been exacerbated by climactic changes (more dry conditions) that lead to spread of fires, raising the profile of this issue both nationally and internationally.

PADDY RICE

- For climate financing to be effective it is important to have a functional large scale MRV system, based on which incentives can be given for greenhouse gas reduction achievements. It is also important to leverage any already existing local networks, which assist in sustained results, and supports an effective exit strategy.

ENTERIC FERMENTATION

- Trust and creating working relationships with the country partners was crucial for managing the project contract, collecting data and delivering the project results within the project timeline. The project team held 3 regional workshops: for South America on 25-26 May 2016 in Argentina; for South Asia on 27-28 August 2016 in Sri Lanka; and for Sub-Saharan Africa on 31 August to 1 September 2016 in Ethiopia that contributed to establishing these working relationships. For each region attendees were a mix of ministry policy-makers, researchers and farmer extension groups. The workshops provided in-person interaction by implementers

of the project with the relevant stakeholders. The workshops created working relationships that were crucial to successfully managing the contracting and collection of the data needed to deliver the outcomes of Phase 1.

OPPORTUNITIES

LIVESTOCK MANURE MANAGEMENT

- The Global Research Alliance on Agricultural Greenhouse Gases (GRA) and the UN Food and Agriculture Organization (FAO) through its 'Action Area under the Global Agenda on Manure' are attempting to reinvigorate efforts on manure management. China is leading the GRA work on manure management going forward and there may be possibilities to link efforts, also including with the Global Methane Initiative (GMI)

OPEN AGRICULTURAL BURNING

- In addition to greater awareness of the impact of climate change on fires and the need to decrease burning, the role of improved land management practices (namely, use of cover crops and other conservation agriculture methods that never involve burning) to serve as a means to decrease atmospheric CO2 is gaining greater appreciation and attention, providing another means to raise the profile of no-burn alternatives.

PADDY RICE

- NAMAs have gained popularity in Southeast Asia. IRRI is currently involved in preparing a detailed proposal for a rice NAMA in Thailand and opportunities exist to transfer the lessons learned in Vietnam. Established partnerships can maximize efforts. IRRI signed a contract for involvement in the World Bank's Sustainable Agriculture Transformation Project in Vietnam (VN-SAT) program (2017-2020[3]). The World Bank will mainstream the use of the AWD suitability maps for Vietnam to assist in targeting areas for AWD implementation. The maps further help define areas for dissemination of AWD+ under national programs in line with countries' NDC.
- FAN in Bangladesh has gained great momentum, with new partners asking to join the forum. This community of practice has the chance to become an agent of change with direct links to local and national policy makers. Lastly, the country NDCs seem to be a good catalyst for the creation of enabling policy environments for effective implementation of mitigation measures and for leveraging additional co-funding.

[3] The strategic orientation of the Vietnam Sustainable Agricultural Transformation Project (vnSAT) is to support the implementation of the Government's Agriculture Restructuring Plan (ARP). It will do so with a combination of assistance to policy and institutional reform that supports the reorientation of the central line ministry, MARD, and associated public agencies as well as key private sector stakeholders, and targeted support to two critical sectors where conditions are most suited to the rapid implementation of the new approach embodied in the ARP. A combination of policy and institutional reform and results in two key sectors will deliver real results for beneficiary farmers, and will demonstrate the merits of this new orientation thereby building support for the continued implementation of the strategy.

ENTERIC FERMENTATION

- There is opportunity for the Enteric Fermentation component to contribute towards framing livestock farming as part of the climate solution globally, not just a source of the problem. The proposed livestock commitments in the 2017 High-Level Assembly Communiqué on improving inventories and efficiency of production serve as a first step by engaging CCAC partners to consider challenges and opportunities of managing enteric methane emissions.
- There are multiple benefits of reducing enteric methane emissions intensity from livestock such as gains in farm productivity, increased income and improved food security. This provides the enteric methane component with opportunities to further reach out to new partners by demonstrating it can complement the work of other organizations that may have different priorities and jointly scale-up efforts to mitigate enteric methane emissions and seek co-financing while leveraging funding from a broad range of other sources for complementary activities.
- Enteric Fermentation component activities also have the potential to provide benefits after the completion of contracted projects by mainstreaming enteric methane mitigation into broader livestock sector investments, policies, and development activities being undertaken by a range of actors in different locations across the globe. The Phase 2 project will contribute to this effort by collaborating with large-scale livestock development programs underway in Bangladesh, Ethiopia, and Uruguay.

LINKS TO DOCUMENTS

- 'Handbook for Measuring Greenhouse Gas Emissions in Rice Cultivation' was prepared by the International Energy Agency (IEA) for MARD with input from the International Rice Research Institute (IRRI), Winrock International, and SNV-Vietnam. https://drive.google.com/file/d/0B5WDk-4vUwyZTHJrNGY4dkpkZGM/view?usp=sharing
- Water Security Threats Demand New Collaborations: Lessons from the Mekong River Basin
- http://foodsecurityindex.eiu.com/Resources
- Final Technical Report National Action Plans for Mitigation in Rice: Comparative Assessment of Institutional Setting and Possible Entry Points for Intervention in the Philippines and Vietnam
- https://drive.google.com/file/d/0B5WDk-4vUwyZNXJSOXF3QUdfOEU/view?usp=sharing
- Study on early drainage mitigates methane and nitrous oxide emissions from organically amended paddy soils http://www.sciencedirect.com/science/article/pii/S001670611630372X
- Study on "How does burning of rice straw affect CH4 and N2O emissions? A comparative experiment of different on-field straw management practices" http://www.sciencedirect.com/science/article/pii/S0167880916306302
- National Action Plans for Mitigation in Rice: Comparative Assessment of Institutional Setting and Possible Entry Points for Intervention in the Philippines and Vietnam https://drive.google.com/file/d/0B5WDk-4vUwyZNXJSOXF3QUdfOEU/view?usp=sharing
- Options for low emission development in the Bangladesh dairy sector http://ccacoalition.org/en/resources/options-low-emission-development-bangladesh-dairy-sector
- Supporting low emissions development in the Ethiopian dairy cattle sector http://ccacoalition.org/en/resources/supporting-low-emissions-development-ethiopian-dairy-cattle-sector
- Low emissions development of the beef cattle sector in Uruguay

http://ccacoalition.org/en/resources/low-emissions-development-beef-cattle-sector-uruguay

- Options for low emission development in the **Kenya** dairy sector - reducing enteric methane for food security and livelihoods
  http://www.fao.org/3/a-i7669e.pdf
- Options for low-emission development in the **Sri Lanka** dairy sector http://www.fao.org/3/a-i7673e.pdf
- Low emissions development of the beef cattle sector in **Argentina** http://www.fao.org/3/a-i7671e.pdf