CLEAN DEVELOPMENT MECHANISM

CDM-EB89-AA-A09

Concept note

Exploration of methodological options for developing ‘agriculture CDM’

Version 01.1

United Nations
Framework Convention on
Climate Change

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1. Procedural background

1. The Executive Board of the clean development mechanism (CDM) (hereinafter referred to as the Board), at its eighty-second meeting, requested the secretariat to elaborate concept notes on methodological issues related to cities, transport, biofuels and **agriculture**.

2. The Board requested that the concept note on agriculture should cover integrated mitigation actions in agriculture combining efficient water pumps, more efficient use of fertilizers and efficient animal husbandry, and it should be presented at its eighty-seventh meeting including inputs from the Methodologies Panel (MP) and the Small-Scale Working Group (SSC WG).

3. Following the above mandate, the concept note on exploration of methodological options for developing 'agriculture CDM' was developed by the secretariat and the MP/WG (MP 68 and SSC WG 49). The Board at its eighty-seventh meeting considered the concept note on the exploration of options for developing CDM methodologies for the agriculture sector (CDM-EB87-AA-A10).

4. At EB 87, the Board requested the MP, the SSC WG and the secretariat to jointly prepare a proposal on development of new and revision of existing specific methodologies, taking into account guidance provided by the Board at this meeting.

5. This work relates to the activity 'Development of new methodologies to broaden the applicability of the CDM' under objective 1(c): 'Develop simplified and user-friendly standards and procedures that increase efficiency and ensure environmental integrity' with a resource allocation as referred to in table 4 on page 15 of the CDM two-year business plan 2016–2017 and management plan 2016 (EB87, annex 1).

6. The call for inputs from stakeholders was open from 17 December 2015 to 27 January 2016, and in total nine public inputs was received. The summary of the comments are contained in Appendix 1.

2. Purpose

7. The purpose of this concept note is to define concrete proposals for top-down methodological work for the agriculture sector (e.g. developing new methodologies or revision to approved methodologies) and justify the relevance of these proposals.

3. Key issues and proposed solutions

8. The analysis in this concept note is focused on the initial list of methodological areas presented in paragraph 28 of the concept note on the exploration of options for developing CDM methodologies for the agriculture sector (CDM-EB87-AA-A10).

9. Each of the proposals for areas of methodological work from the previous concept note is reviewed and further analyzed. Appendix 2 of the document provides details on the proposal for each specific top-down methodological work to undertake.

    (a) **New methodology(ies) for grazing land and livestock management:** There is substantial scope for reduced emissions intensity (GHG emissions per unit of

output) through increased productivity. For example, various technical mitigation options have been recommended by FAO, which include options related to feed additives and feeding practices, options related to manure management and options related to animal and reproductive management practices and technologies. One consolidated methodology for a number of different technologies/measures or individual methodologies for each technology/measure could be developed.

(b) **Revision of existing livestock methodology AMS-III.BK "Strategic feed supplementation in smallholder dairy sector to increase productivity" to simplify and streamline requirements**: The methodology AMS-III.BK has a complex approach to determine baseline and project emissions. The main source of complexity is that the methodology has been designed for cases where there is no information available at group level (e.g. number of milking cows, dry cows and replacement heifers). A revision may be proposed to include a new simplified approach, for cases where information is available at the group level. Information required would be: number of animals per group, average weight and amount of each feed type and additive supplied.

(c) **New methodologies for crop nutrition management:** There is substantial scope for further emission reductions in this area. It is proposed to develop a new methodology (based on AMS-III.BF "Reduction of N2O emissions from use of Nitrogen Use Efficient (NUE) seeds that require less fertilizer application") to cover various measures:

(i) Controlled release (coated) fertilizers, which improve efficiency of Nitrogen (N) use and reduce GHG emissions per unit of output;

(ii) Precision agriculture techniques to increase efficiency of production and reduce fertilizer related emissions per unit of output;

(iii) Nitrification inhibitors to reduce N2O emissions.

(d) **Revisions to AMS-III.Y "Methane avoidance through separation of solids from wastewater or manure treatment systems" and AMS-III.F "Avoidance of methane emissions through composting" to include use of organic bedding material**: It is proposed to develop a revision of AMS-III.Y and AMS-III.F to include an alternative for the calculation where the applicability condition that restricts use of bedding material is not needed. The current calculation in AMS-III.Y is based on the measured amount of separated solid, while the alternative approach would be based on monitoring the number and the type of animals. Additional provisions for conservativeness would be needed in the alternative approach. This work will widen the scope of the methodology and will provide simplified options.

(e) **A new methodology for reducing food wastes through efficient processing and/or storage:** This is a new project area with large emission reduction potential and will contribute to food security. Project activities may reduce food waste at processing and storage facilities. The objective will be to reduce the volume of agricultural input supplied to the facility for a given food output from the facility. An example is a reduction in post-harvest losses of rice with a focus on storage (e.g. use of a special bag for rice storage, which protects rice from

moisture, pest infestation and fungal growth) and milling (drying, threshing improvements or specific technologies) at a rice mill. One simple approach could be to start with simple methodologies applicable to specific crops and their processing chain. Rice could be the first candidate.

(f) **New methodologies for application of renewable energy and energy efficiency for agriculture:** There is a lot of interest in this area (e.g. as expressed in INDCs) and the proposed work builds on existing methodologies. The specific cases identified are: Solar powered water pumps; Crop and grain drying; and Greenhouse Heating.

10. For the two following cases, considering their significant mitigation potential as well as complexity related to baseline and monitoring, it is proposed to undertake exploratory work and further analyse the possibility of developing CDM methodologies. See Appendix 2 for details.

(a) **Avoidance of methane and N2O emissions from fire management:** There is potential for a new project area with wide environmental benefits and scope for co-operation with other national authorities. A major area of anthropogenic wildfire GHG emissions is African savannas. In project savanna fire management activites, baseline and project emissions relate to the intensity of burn as well as the area of burn which is a different situation to AMS-III.BE "Avoidance of methane and nitrous oxide emissions from sugarcane pre-harvest open burning through mulching" (the latter assumes all mulched matter would be burnt).

(b) **Demand-side measure:** It is proposed to further examine the possibility of developing a methodological framework to estimate emission reductions for demand-side measures such as changing to low carbon diets which reduces upstream emissions. An example would be the provision of the vegetarian menu at institutions.

11. Two following cases related to the development of standardized baselines were included in paragraph 28 of the concept note presented to EB87. Based on the guidance provided by the Board, it is proposed that the secretariat consults with DNAs to check if there is interest to propose standardised baseline in these areas:

(a) Development of local/regional standardized values under existing fertilizer methodologies AMS-III.BF "Reduction of N2O emissions from use of Nitrogen Use Efficient (NUE) seeds that require less fertilizer application" and AMS-III.A "Offsetting of synthetic nitrogen fertilizers by inoculant application in legumes-grass rotations on acidic soils on existing cropland";

(b) Development of standardized baselines using AMS-III.AU "Methane emission reduction by adjusted water management practice in rice cultivation", i.e. consider replication of ASB0008 to other rice-producing countries.

12. In summary, the following work in table 12 is proposed for consideration by the Board to advance this product:

Table 1. Proposal on further methodological work in the agriculture sector

No.	Case	Proposal
1	New methodologies for grazing land and livestock management	New methodology
2	Simplification and streamlining of existing livestock methodology AMS-III.BK	Revision
3	New methodologies for crop nutrition management	New methodology
4	Revisions to AMS-III.Y and AMS-III.F to include use of organic bedding material	Revision
5	New methodology for reducing food wastes through efficient processing and/or storage	New methodology
6	New methodologies for application of renewable energy and energy efficiency for agriculture	New methodology

13. For items in table 23, it is proposed for consideration by the Board to undertake exploratory work:

Table 2. Proposal on further exploratory work in the agriculture sector

No.	Case	Proposal
1	Avoidance of methane and N2O emissions from fire management	Revision / New methodology
2	Demand-side measures (e.g. dietary choice)	New methodology

14. Items in No. 4 and No. 6 of table 12 would require lower level of effort as compared to the other items in table 12 and 23, and it may be feasible to deliver them during the last two quarters of 2016 if the Board were to approve the above plan. Considering that the Board has prioritised the work of the secretariat in the area of project registration and issuance to clear any backlogs and taking into account the limited number of meetings of the MP and the SSC WG remaining in the year, some items in table 12 and 23are likely to extend to 2017 although substantial progress could be achieved during the year.

4. Impacts

15. Simplification and broadening will potentially facilitate the development of more CDM projects and programmes in the agriculture sector.

5. Subsequent work and timelines

16. The above work would be undertaken jointly by the MP and the SSC WG and the secretariat as part of the 2016 MAP. The SSC WG will take the lead in finalising the recommendations, and the MP will provide inputs to the SSC WG.

6. Recommendations to the Board

17. The secretariat recommends that the Board considers the analysis and approves the proposals for further methodological work as contained in table 12 and further exploratory work, as contained in table 23. The Board may also wish to provide further guidance as necessary.

Appendix 1. Summary of public inputs

1. Stakeholders were invited to provide their input including but not limited to issues and initial proposals indicated in the concept note. The call for inputs from stakeholders was open from 17 December 2015 to 27 January 2016, 24:00 GMT.

2. In total nine public submissions were received from stakeholders and their inputs are summarized in the table below.

Table 1. Summary of public inputs

Person	Organisation	Relevant comments
Adrian Muller	Research Institute of Organic Agriculture FiBL	• Include organic fertilisers for soil carbon sequestration
Debbie Reed	Coalition of Agricultural Greenhouse Gases	• Review ACR Grazing Land and Livestock Management methodology • Review Climate Action Reserve Nitrogen Management Project Protocol Version 1.1
Teresa Anderson	ActionAid International	• Against inclusion of soil carbon
Daniel Bretscher	Agroscope (Institute for Sustainability Sciences)	• Mention of additional initiatives • Demand side measures. Reduced consumption of animal products
Robert Parkhurst	Environmental Defense Fund	• Consider in context of Paris Agreement • Look at aggregation and landscape approaches • Look at ACR, CAR and CARB work on agricultural emissions • Include Nitrous oxide and methane reduction potential in CSA • Consider organic fertilisers inputs • Look at USDA *COMET-Farm* Voluntary Carbon Reporting Tool
Kelsey Perlman	Carbon Market Watch	• Do not include avoided deforestation and soil carbon
Haben Asgedom Tedla	Farmers Edge Inc	• Consider Alberta carbon offset system protocols
Robert Savé M	IRTA	• General inputs relating to Mediterranean conditions
Geoffrey Orme-Evans	Humane Society International	• Include reference to sustainable development, inter alia health and animal welfare impacts. • Demand side measures. Dietary choices.

Appendix 2. Details of proposals

1. New methodologies for grazing land and livestock management

Case:
New methodologies for grazing land and livestock management

- Various measures can be taken to increase productivity and reduce GHG emissions per unit of output. For example, various technical mitigation options have been recommended by FAO, which include options related to feed additives and feeding practices; options related to manure management (dietary management); and options related to animal and reproductive management practices and technologies. One consolidated methodology for a number of different technologies could be developed or individual methodologies for each technology.

Included in other programs:
Alberta Offset Credit System Protocols

- Reduced Age at Harvest of Beef Cattle
- Reducing Days on Feed of Beef Cattle
- Selection for Low Residual Feed Intake Markers in Beef Cattle

Australia Emission Reduction Fund (ERF)

- Beef cattle herd management
- Reducing greenhouse gas emissions in milking cows through feeding dietary additives

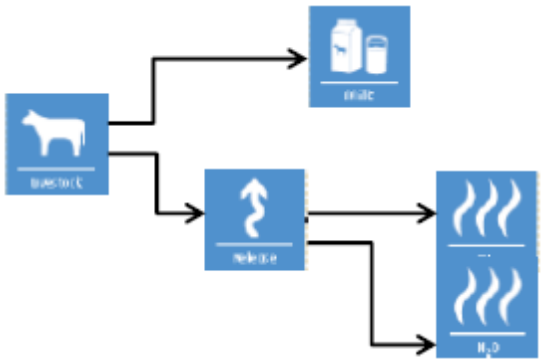
American Carbon Registry

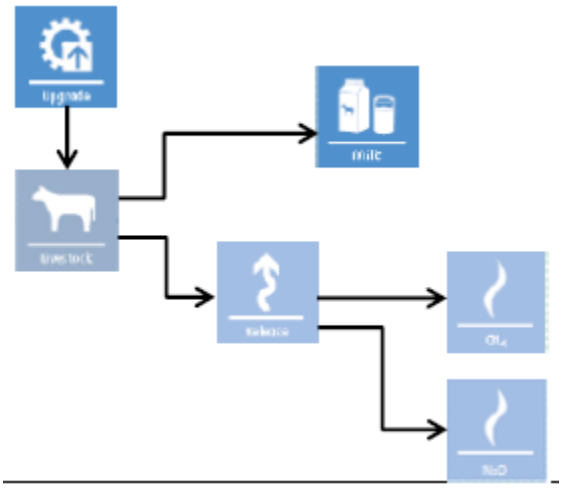
- Grazing Land and Livestock Management

Basic details of the methodological approach proposed: baseline, project and leakage emissions

- Baseline scenario would be historic emissions per unit of production – kgCO2e/head/year normalized for carcass weight or kgCO2/unit of milk normalized for fat content.
- CH4 emissions can be derived from default values based on feed intake multiplied by number of animals.
- N2O emissions from dung and urine can be based on the protein concentration of feed intake and the estimated net nitrogen excretion.
- Project and leakage – any increase in above and below ground or soil carbon stocks change. Soil carbon stocks accounted for as per the methodological tool: Project and leakage emissions from biomass.

Baseline Scenario



Project Scenario	
List of key parameters to be monitored • N2O and CH4 emissions per live weight gain/milk produced. Feed intake. Output.	
Bibliography • Tackling climate change through livestock. FAO, 2013 http://www.fao.org/3/i3437e.pdf • Mitigation of greenhouse gas emissions in livestock production. A review of technical options for non-CO2 emissions. FAO, 2013. http://www.fao.org/3/a-i3288e.pdf • Livestock – Climate Change's Forgotten Sector, Chatham House • Beef cattle herd management: overview of calculations - ERF	
Estimation of potential for emission reduction (if available in the literature) • Greenhouse gas emissions from the livestock sector are estimated to account for 14.5 per cent of the global total. Greenhouse gas emissions by the livestock sector could be cut by as much as 30 percent through the wider use of existing best practices and technologies, according to the FAO.	
Consideration of negative environmental impact • Impacts of further intensification of output on water and air quality should be considered.	
Other issues • Animal welfare concerns should be considered. • Accounting for LULUCF emissions.	

2. Simplification and streamlining of existing livestock methodology AMS-III.BK

Case: Simplification and streamlining of existing livestock methodology AMS-III.BK (Strategic feed supplementation in smallholder dairy sector to increase productivity)
• Revision of AMS-III.BK is proposed. • AMS-III.BK is applicable to project activities that use strategic supplementation to improve the digestibility of feedstuff fed to large ruminants (i.e. dairy cows and/or buffalo) in the smallholder diary sector, for the purpose of increasing milk productivity and thus reducing methane emissions per unit of milk produced. • The methodology has a complex approach to determine baseline and project emissions. Baseline emissions are determined based on the specific methane emissions per unit of milk production in the baseline, multiplied by the milk production in the project. The main source of the complexity is related to the assumption that it is not possible to have information on the different groups of animals (milking cows, dry cows and replacement heifers). Information required (and presumed not available at

group level) would be: number of animals per group, average weight and amount of each feed type fed and additive supplied.

- Other source of complexity is the lack of historical information. The methodology requires establishment of a control group to determine baseline emissions.
- The revision may include a new approach with few points of contact with the existing one.
- It could also be explored to prepare a model (in an Excel sheet) as in the Australian Protocol (see below).

Included in other programs:

Alberta Offset Credit System Protocols

- Emissions Reductions from Dairy Cattle
- http://esrd.alberta.ca/climate-change/guidelines-legislation/specified-gas-emitters-regulation/documents/ProtocolEmissionReductionCattle-Jan2010.pdf

Australia Emission Reduction Fund

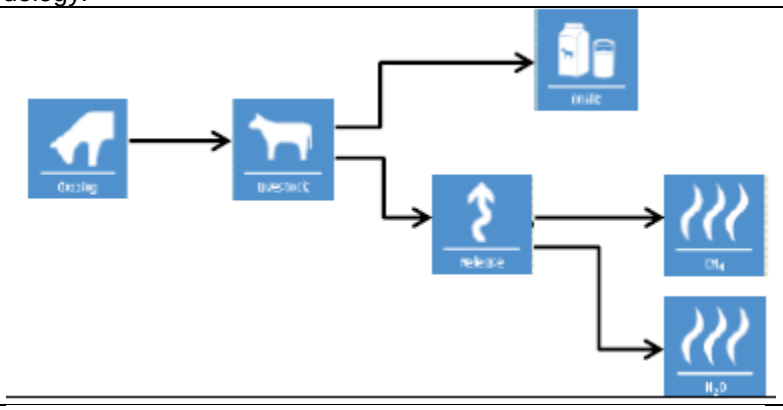
- Reducing Greenhouse Gas Emissions by Feeding Dietary Additives to Milking Cows https://www.comlaw.gov.au/Details/F2013L01554

In both cases it is assumed that information for each group of animals is available. The Protocols follow different ways to facilitate the calculations. The Alberta case provides default factors, while the Australian case provides a model developed in an Excel sheet.

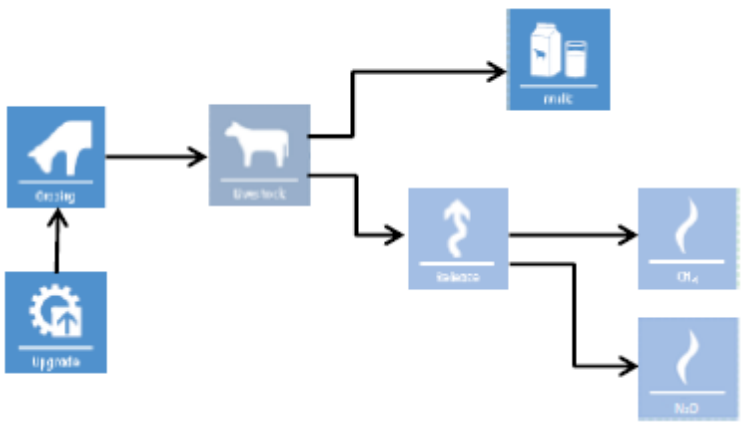
Basic details of the methodological approach proposed: baseline, project and leakage emissions

- The proposal is to explore the usability of the methodology based on information at each group level for developing countries.
- The above mentioned Protocols could be considered in the preparation of the revised methodology.

Baseline Scenario



Project Scenario

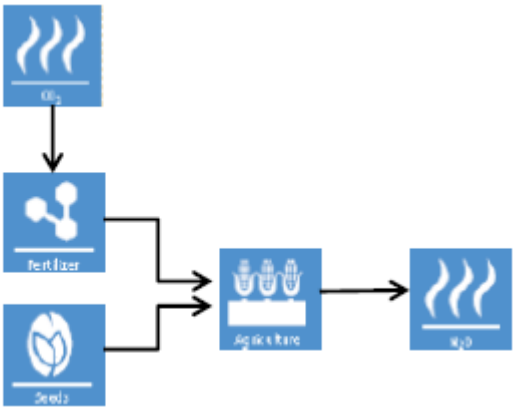


List of key parameters to be monitored
Bibliography • IPCC 2006 Guidelines. Chapter 10: Emissions from Livestock and Manure Management.
Estimation of potential for emission reduction (if available in the literature)
Consideration of other environmental issues
Other issues • The current complex monitoring methodology on AMS.III.BK is a disincentive to its use and a key aim should be to make it user friendly.

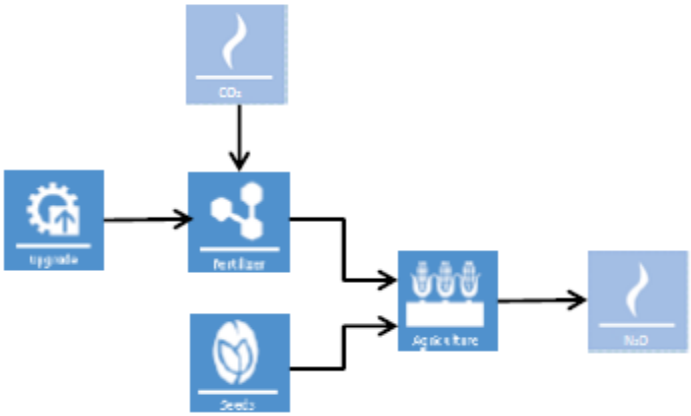
3. New methodologies for crop nutrition management

Case: New methodologies for crop nutrition management
• New methodology (but based on AMS-III.BF) ✓ Controlled release (coated) fertilizers. Improve efficiency of N use and reduce GHG emissions per unit of output. ✓ Precision agriculture techniques to increase efficiency of production and reduce fertilizer related emissions per unit of output. ✓ Nitrification inhibitors to reduce N2O emissions.
Included in other programs: Alberta Offset Credit System Protocols • Agricultural Nitrous Oxide Emission Reductions Australia Emission Reduction Fund • Fertiliser use efficiency in irrigated cotton Climate Action Reserve • Nitrogen Management Project Protocol Version 1.1
Basic details of the methodological approach proposed: baseline, project and leakage emissions • Baseline emissions per unit of output. Emissions from fertilizer production and use as per AMS-III.BF • In the case of nitrification inhibitors, monitoring of direct N2O emissions is not feasible. Inhibitors use and emission reductions factors would need to be developed. • Issue to be considered: ✓ Relation between N2O and CH4 emissions. AMS-III.BF includes applicability condition in order to ensure that CH4 emissions are not increased as a consequence of project implementation. ✓ Implementation of other management practices. AMS-III.BF requires that no other new management practice is implemented during the crediting period. This condition may be revised but changes in the methodological approach will be needed.

Baseline Scenario



Project Scenario



List of key parameters to be monitored
As per AMS-III.BF

Bibliography

- Akiyama H., X. Yan, and K. Yagi (2010). Evaluation of effectiveness of enhanced efficiency fertilizers as mitigation options for N2O and NO emissions from agricultural soils: meta-analysis: Mitigation options for N2O and NO emissions. Global Change Biology.
- Bruce A. Linquist et al. (2012) Fertilizer management practices and greenhouse gas emissions from rice systems: A quantitative review and analysis. Field Crops Research. http://linquistwp.plantsciences.ucdavis.edu/wp-content/uploads/2014/03/2012-Linquist-et-al-FCR-Review-GHG-fert.pdf

Estimation of potential for emission reduction (if available in the literature)

Consideration of negative environmental issues
No negative issues identified.

Other issues

4. Revisions to AMS-III.Y and AMS-III.F to include use of organic bedding material

Case:
Revision of AMS-III.Y and AMS-III.F to include use of organic bedding material

- Revision of AMS-III.Y and AMS-III.F is proposed.
- It is proposed to include in both methodologies an alternative for the calculation where there is no restriction on the use of bedding material.
- The calculation in these methodologies is based on the measured mass of separated solids. The alternative would be based on monitoring the number of animals, or other methods to be determined.

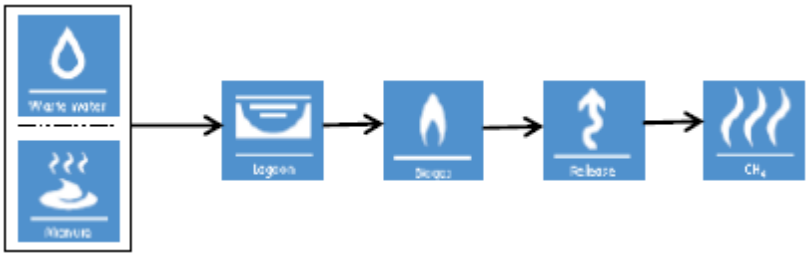
Included in other programs:
Verified Carbon Standard

- VCS Methodology VMR0003
  http://www.v-c-s.org/methodologies/revisions-ams-iiiy-include-use-organic-bedding-material-v10

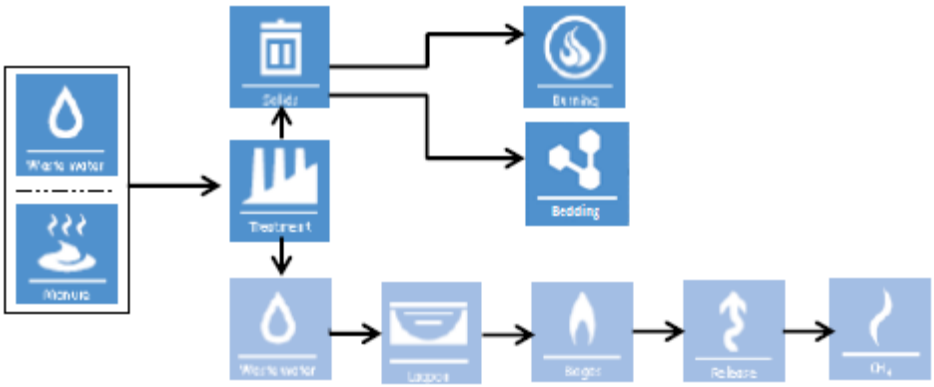
Basic details of the methodological approach proposed: baseline, project and leakage emissions

- The condition included in AMS-IIII.Y and AMS-III.F is consistent with the procedure for baseline emissions calculation.
- It should be noted that equation 1 includes the parameter $M_{ss,y}$ Mass (dry matter basis) of total separated solids in year y. Two other key parameter are related with the type of livestock: $B_{0,LT}$ Maximum methane-producing potential of manure generated by animal type and $VS_{LT,y}$ Annual amount of volatile solids excreted by one animal of livestock type.
- The basic assumption is that the separated solids are manure generated by animals of types identified by the index LT. This assumption requires including the limitation for organic material.
- It would be possible to include an alternative procedure for the calculation, similar to the one included in VMR0003, based on the number of animals. In this case, the limitation may be not needed, as the mass of solid is not monitored.

Baseline Scenario



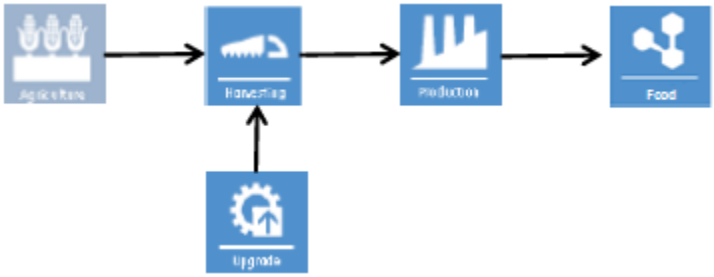
Project Scenario



List of key parameters to be monitored Number of animals per livestock type.
Bibliography
Estimation of potential for emission reduction (if available in the literature)
Consideration of negative environmental issues No negative issues are identified.
Other issues

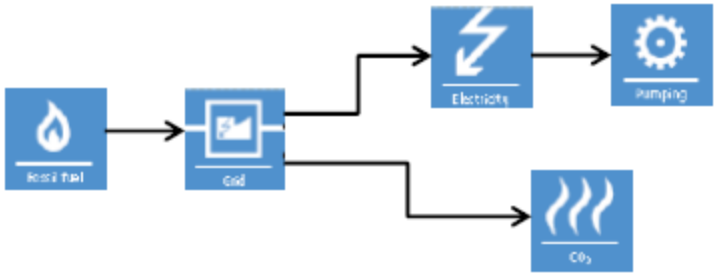
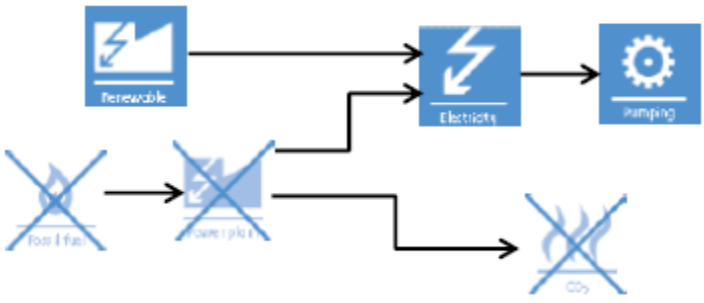
5. A new methodology for reducing food wastes through efficient processing and/or storage

Case: New methodology for reducing food wastes through efficient processing and/or storage
• The new methodology which may contain elements of other existing methodologies and tools. • Project activities may reduce food waste at processing and storage facilities. The objective will be to reduce the volume of agricultural input supplied to the facility for a given food output. • An example is a reduction in post-harvest losses of rice with a focus on storage and milling (drying, threshing improvements or specific technologies) at a rice mill. In the Philippines, a special bag for rice storage, which is made of multilayer polyethylene and protects rice from moisture, pest infestation and fungal growth, was developed by the International Rice Research Institute (IRRI). This bag contributes to avoiding the 10 percent of rice lost due to fungus and rodents. One simple approach could be to start with simple methodologies applicable to specific crops and their processing chain. Rice could be the first candidate.
Included in other programs: No
Basic details of the methodological approach proposed: baseline, project and leakage emissions • Baseline emissions will be derived from the quantity of raw material input to the processing plant and associated agricultural emissions for a given processed food output. The basic concept is to determine emission reductions based on: a) the specific amount of raw material per unit of processed food before and after project implementation and b) the emissions from some specific sources (e.g. not from soil carbon losses). • Agricultural emissions should be calculated on a sample basis from farms supplying a facility. The Methodological tool: Project and leakage emissions from biomass can serve as a source for the estimation of these emissions. • However, the tool is currently developed for project emissions and leakage, hence its use for baseline emissions may be not conservative. • Other issue to be addressed is that the Tool doesn't provide the formulae for CH4 emissions, and therefore may not be useful for rice cultivation, but AMS-III.AU could be used instead. For N2O emissions from rice cultivation AMS-III.BF could be used as a basis.

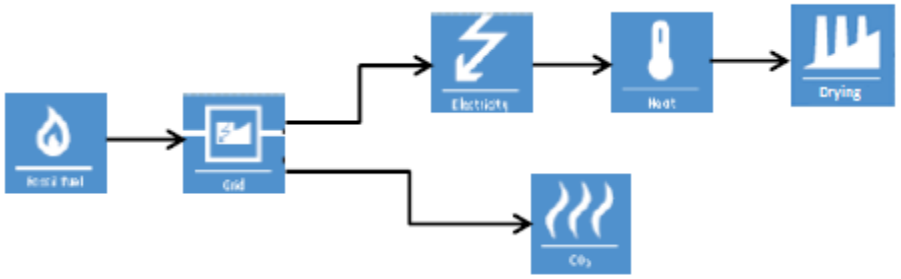
Baseline Scenario	
Project Scenario	
List of key parameters to be monitored • N2O and CO2 emissions from fertilizer production and application • CO2 emissions from energy consumption in cultivation and transport • CH4 emissions from rice production can be calculated as per AMS-IIII.AU	
Bibliography • Food Wastage Footprint: Impacts on Natural Resources. FAO 2013. http://www.fao.org/docrep/018/i3347e/i3347e.pdf • Mitigation of Food Wastage: Social Costs and Benefits. FAO 2013 http://www.fao.org/3/a-i3989e.pdf	
Estimation of potential for emission reduction (if available in the literature) • Data from the FAO states that without accounting for GHG emissions from land use change, the carbon footprint of food produced and not eaten is estimated at 3.3 Gt CO2e. Wastage of cereals in Asia is a significant problem, with major impacts on carbon emissions and water and land use. Rice's profile is particularly noticeable, given its high methane emissions combined with a large level of wastage. • From IPCC AR5: "Reductions of losses in the food supply chain — Globally, rough estimates suggest that ~30–40% of all food produced is lost in the supply chain from harvest to consumption (Godfray et al., 2010). Energy embodied in wasted food is estimated at ~36 EJ/yr (FAO, 2011). In developing countries, up to 40% is lost on farm or during distribution due to poor storage, distribution, and conservation technologies and procedures."	
Consideration of negative environmental issues • A reduction of food waste is likely to have no significant negative environmental issues**.**	
Other issues • Monitoring and verification of such projects may be an issue in small and rural isolated projects.	

6. New methodologies for application of renewable energy and energy efficiency for agriculture

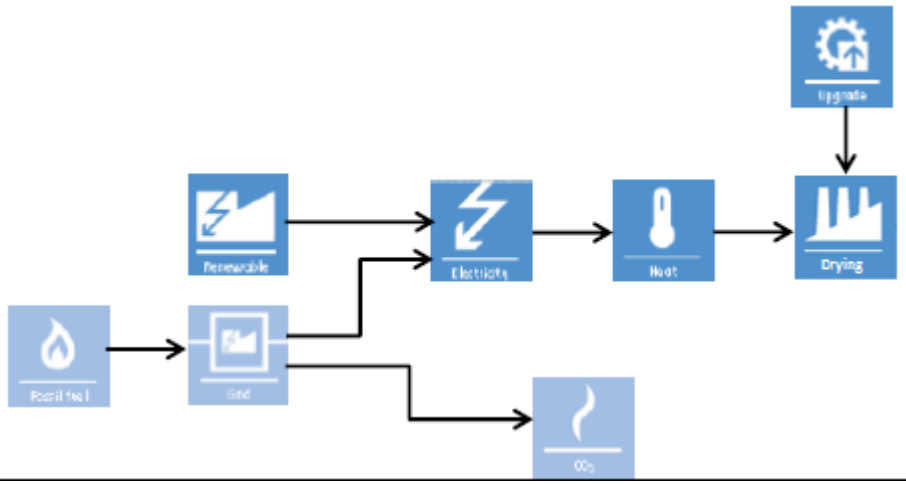
Case: New methodologies for application of renewable energy and energy efficiency for agriculture	
• New methodologies are needed. • The specific cases identified are: ✓ Solar powered water pumps	

✓ Crop and grain drying ✓ Greenhouse Heating
Included in other programs: No
Basic details of the methodological approach proposed: baseline, project and leakage emissions 1) Solar powered water pumps • Instead of developing a new methodology, it could be assessed if a revision of AMS-II.F and AMS-II.P could cover this case. One simple solution could be to use the baseline scenario of Greenfield and to eliminate the project emissions section. It would be needed to revise carefully the applicability conditions and allow for diesel generators in the baseline. 2) Crop and grain drying • One possible solution here is to develop a new methodology based on a concept similar to AMS-IIII.Z: specific consumption in the baseline of fuel per unit of dried crop / grain. 3) Greenhouse heating • In this case, the basis for the solution could be to adapt the methodology for energy efficiency and renewable energy in buildings (AMS-III. AE). It would be needed to collect information about greenhouses and also about how solar energy is applied in greenhouses.
Baseline Scenario Solar powered water pumps 
Project Scenario 

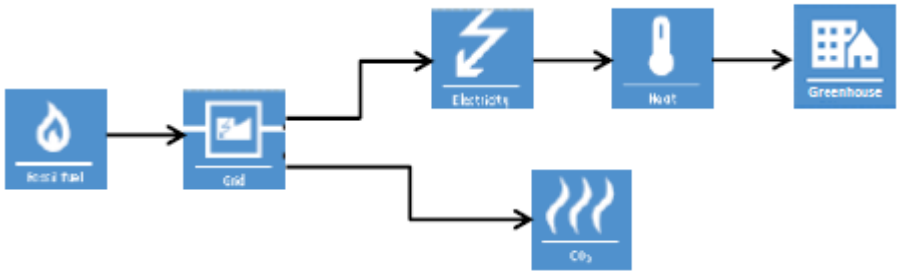
Baseline Scenario
Crop and grain drying

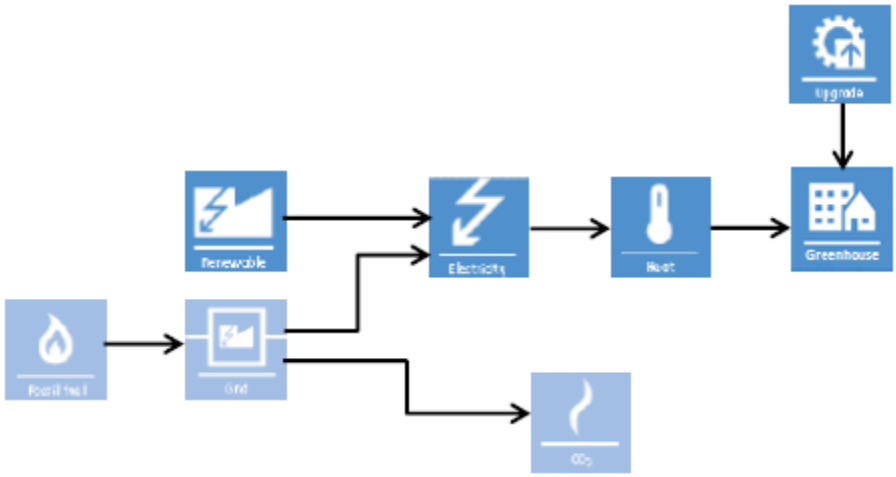


Project Scenario



Baseline Scenario
Greenhouse Heating



Project Scenario	
List of key parameters to be monitored • As per AMS-II.F and AMS-II.P with the addition of diesel generation powered baseline pumps.	
Bibliography • International Workshop: Prospects for solar-powered irrigation systems (SPIS) in developing countries (http://www.fao.org/nr/water/docs/FAO_GIZ_SOLAR_FINALREPORT.pdf)	
Estimation of potential for emission reduction (if available in the literature) • It has been estimated by Sun Edison that India has between 26 and 27 million irrigation pumps, of which seven to eight million run on liquid fuel. This fuel is typically diesel, but as many as a million pumps run on subsidized kerosene – originally meant for lighting usage. • Solar irrigation systems are mentioned in a number of INDCs, such as Bangladesh, Ghana, Yemen.	
Consideration of negative environmental issues • The impact of any additional irrigation on groundwater depletion should be considered.	
Other issues • Cost of the technology and its diffusion • The requirement for capacity building and technical advice to ensure efficient water application (see above).	

7. Avoidance of methane and N2O emissions from fire management

Case: Avoidance of methane and N2O emissions from fire management
• New methodology • A major area of anthropogenic wildfire GHG emissions is African savannas. Specific type of project **savanna** fire management activity likely where baseline and project emissions relate to the intensity of burn as well as the area of burn which is a different situation to AMS-III.BE (the latter assumes all mulched matter would be burnt).

Included in other programs:

Australia Emission Reduction Fund

- Savanna fire management: This methodology focuses on change firing practices (e.g. change of season) resulting in a reduction of CH4 and N2O emissions.

Verified Carbon Standard

- VM0032 Methodology for the Adoption of Sustainable Grasslands through Adjustment of Fire and Grazing: This methodology focus in soil carbon sequestration.

Basic details of the methodological approach proposed: baseline, project and leakage emissions

- It could be explored the feasibility of adapting the Australian methodology to other areas. Contact with the Australian Institution in charge is recommended.
- Under this methodology, the aim of the projects is to reduce the emission of CH4 and N2O from fire by using fire management primarily in the early dry season (instead of the baseline use in the late dry season).
- Baseline is historical emissions from savanna burning in area. Project emissions are monitored and include early dry season burn and fossil fuel usage.
- The document cited in bibliography explicitly mentions the development of a methodology as a practical step to help these projects promote demand and access markets:
- "Developing an international methodology through, for example, the Verified Carbon Standard (VCS) or Gold Standard (GS), to enhance and promote demand for SFiM Credits".
- It should be noted that this methodology provides for the determination of the emissions reduction several set of values (vegetation types, efficiencies and emission factors). Some options could be further analyzed for the methodological approach to be followed:
  - ✓ To prepare a framework methodology where the values are to be provided by the project developer
  - ✓ To assess if it is possible to adapt the Australian values to other countries/regions
  - ✓ To explore whether there are literature available about these values in other countries.

Baseline Scenario

Project Scenario

List of key parameters to be monitored

Bibliography

- The global potential of indigenous fire management. Findings of the regional feasibility assessments. International Savanna Fire Management Initiative. United Nations University. 2015 http://i.unu.edu/media/tfm.unu.edu/news/2151/Final-Report-Findings-Regional-Feasibility-Assessments-ISFMI.pdf

Estimation of potential for emission reduction (if available in the literature)

- The report from UNU (cited above) states:
  - ✓ ".annual emission reduction potential from reducing CH4 and N2O emissions could be expected to be in the vicinity of 0.1 to 0.15 Gt CO2eq per year"
  - ✓ "Savanna fire emissions are predominantly sourced from Africa, contributing

	approximately 71% of all savanna CO2 emissions, followed by South America (12%), Australia (7.3%) and South East and Equatorial Asia (5.9%)."
Consideration of negative environmental issues	
Other issues • Savanna fire management projects have notable co-benefits such as improving biodiversity, improving food security and health and helping remote communities adapt to climate change.	

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Document information

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01.0	25 April 2016	Initial publication as an annex to the annotated agenda of EB89.

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