



CDM: Recommendation Form for Small Scale Methodologies (version 01)
(To be used for presenting questions/proposals/amendments to the simplified methodologies for small-scale CDM project activity categories)

Date of SSC WG meeting:	16–19 February 2010, SSC WG 24
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Revision to AMS-I.D to include cover crops of short-cycle cellulosic biomass from non-dedicated plantations
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	AMS-I.D
Name of the authors of the query:	Badri Narayanan V Institution: Southpole Carbon Asset Management Ltd. b.narayanan@southpolecarbon.com , p.buergi@southpolecarbon.com

Summary of the query:

Please use the space below to summarize the query related to SSC methodologies/categories SSC Modalities and Procedures provide recommendation/analysis of the SSC WG.

Original text from PP:

The request for revision in a nutshell

The project proponents believe that the applicability conditions of the current AMS.I.D, Version 15 methodology are robust but unfortunately too restrictive, excluding many very good projects. By our proposal, the scope of the methodology can be easily widened while keeping the environmental integrity. The proposed revision to AMS I.D entails the extension of possible biomass feedstock for biomass based projects to include “cover crops of short-cycle cellulosic biomass from land left uncultivated between regular cropping seasons” to the applicability conditions of the methodology. For such crops, the proposed methodology revision includes additional validation and verification requirements in order to ensure compliance with a strict definition of the term above.

Background of the methodology revision

Grameena Abhivrudhi Mandali (GAM), a registered Not-for-Profit organization in India, is implementing a small-scale CDM Program of Activities (CDM SSC PoA) targeting small-scale biogas-based power generation projects in India. The biogas plants will use biomass and manure sourced from local farmers to produce clean electricity and thermal energy. A typical CPA will utilize agricultural waste, manure and cover crops of short-cycle cellulosic biomass (see below) to produce electricity using state-of-the-art technology based on the mesophilic biodigestion process (biogas digesters) using mixed biomass feedstocks. The CPA will displace fossil fuels and carbon-intensive electricity from the grid, thereby reducing GHG emissions. It will also promote new investment in renewable energy projects and contribute to sustainable development in rural India by generating additional income for local farmers.

Proposed project activities under the PoA will have installed capacities ranging from 347 kW_e to 2 MW_e, thereby leading to relatively small GHG emission reduction potentials at each unit level. , GAM proposes to launch a CDM SSC PoA in order to cover such project activities in an efficient manner across India.

To implement the PoA, the appropriate approved SSC CDM methodologies are AMS 1.D. and AMS 1.C. However methodology AMS.I.D. (version 15) cannot be applied to the proposed PoA as a result of a

restriction in the applicability conditions for PoAs (current version of Paragraph 23):

“In the specific case of biomass project activities the applicability of the methodology is limited to either project activities that use biomass residues only or biomass from dedicated plantations complying with the applicability conditions of AM0042.”

As the proposed PoA plans to utilise **cover crops of short-cycle cellulosic biomass from land left uncultivated between regular cropping seasons** (further defined below) as feedstock, it would not be possible to launch the CDM PoA as per Paragraph 23 of AMS.I.D. Hence GAM requests a minor revision in the methodology to include as feedstock **“cover crops of short-cycle cellulosic biomass from land left uncultivated between regular cropping seasons”**. For the avoidance of doubt, the definition is further specified as follows:

Definition of “cover crop” in the context of the methodology revision:

A crop planted between successive main crop cycles to prevent leaching or soil erosion and to provide temporary vegetative cover and green manure.

Definition of “short-cycle cellulosic biomass” in the context of the methodology revision:

The phrase short-cycle cellulosic biomass is used for plant materials with a short cultivation cycle of 6-16 weeks, composed largely of cellulose, hemicellulose, low quantities of lignin and small amounts of proteins, lipids (fats, waxes and oils) and ash. Typically the organic dry substance of short-cycle cellulosic biomass would be in excess of 80% of dry substance, and digestible organic dry substance would be in excess of 70% of the organic dry substance.

Definition of “land left uncultivated between regular cropping seasons” in the context of the methodology revision:

Cropped areas, which are not cultivated by standard agricultural methods for a certain period each year. For example, when any seeding area is not cropped in the same year, it may be treated as uncultivated land.

Rationale for using cover crops of short-cycle cellulosic biomass in the context of the PoA:

According to experience from project developers and technology providers involved in the PoA, biogas plants are capital intensive (€ 3-4 million/MW in Europe) and hence optimising construction cost as well as maximising biogas yield is critical to make biogas affordable in rural India. This cannot be achieved through singular use of manure as this would result in low biogas yield of around 1 m³ biogas/day from each m³ of digester volume. Furthermore the increased manure content results in excessive nitrogen loading in the digester which in turn inhibits the required microbial action and needs to be off set with large quantities of fresh water¹.

Similarly, it would not be possible to build the plant with singular use of agricultural residues as this would increase the organic matter loading to beyond the optimal level of 3.5 kg/m³ of digester volume, since agricultural residues also contain non-digestible organic matter (e.g. lignin). Likewise, this cannot be achieved through singular use of food industry waste since most food processing units in India are relatively small and hence the feedstock availability would not sustain an industrial biogas plant with capacity of 4000 to 12000 m³ Biogas/day.

Hence to get optimal biogas yield from the mesophilic process, i.e. 2 m³ biogas/day per m³ of digester volume, it is mandatory to have an appropriate mix of manure + agricultural residues + food industry waste + cover crops of short-cycle cellulosic biomass. Only in this way is it possible to exploit the tremendous potential for generating electricity and heat through biogas processes in rural India.

The objective of the proposed PoA is to generate the maximum amount of electricity and heat as well as organic fertiliser from the feedstock available in rural India. It is specifically clarified that the PoA distinguishes itself from typical waste management projects where the focus is on liquid effluent treatment or solid waste management rather than optimising the potential yield of energy and organic fertiliser.

¹ Alastair J. Ward, Phil J. Hobbs, Peter J. Holliman, David L. Jones: “Optimisation of the anaerobic digestion of agricultural resources”, Bioresource Technology 99 (2008). pp. 7928–7940

Cover crops of short-cycle cellulosic biomass will be sourced from farmers who are today adopting only singular crop cultivation on non-irrigated lands. India has 140.9 million hectares of arable land (i.e. net area sown) and 55.1 million hectares is irrigated land (Government of India, Fertiliser Statistics 2005-06). India's gross cropped land area (net area sown + areas sown more than once) is 195 million hectares, indicative of the fact that around 55 million hectares land has 2 crops per year. Another 20 million hectares would be under 2 season's mono cropping (E.g. Sugarcane, cassava, coconut / palm plantations, banana/fruit trees, etc.). This leads to the inference that more than 60 million hectares of land is under 1 season mono cropping. Such land is not suitable for a second crop of grain or any other food crop. However, such land could be put to productive use to grow cover crops of short-cycle cellulosic biomass.

Cultivation of cover crops of short-cycle cellulosic biomass would benefit the soil in a number of ways including restoring its nutrition balance, decreasing erosion and run-off and maintaining the soil water balance. More importantly cover crops of short-cycle cellulosic biomass provide an opportunity for additional income generation among local farmers. Statistics published by the Agricultural Department (Government of India, 2004), indicate that the number of operational holdings (i.e. cultivated land) occupied by marginal and small farmers is about 80% of the total holdings; the number of holdings decreasing towards greater size farms.

Critically, the proposed cover crops of short-cycle cellulosic biomass do not compete with food production, since they will be cultivated only when the land is left uncultivated between regular cropping seasons (due to the non-feasibility of cultivated main crops). Furthermore the farmers' earnings from cover crops of short-cycle cellulosic biomass cultivation is always lower than that from growing food crops, which can be verified during validation and verification of the individual CPAs.

The proposed methodology revision

The proposed revision to AMS I.D version 15 would be to add **"cover crops of short-cycle cellulosic biomass from land left uncultivated between regular cropping seasons"** (as defined above) to paragraph 23).

In order to ensure environmental integrity, a new paragraph 24) is suggested.

- 23) In the specific case of biomass project activities the applicability of the methodology is limited to either project activities that use biomass residues; or biomass from dedicated plantations complying with the applicability conditions of AM0042; or "cover crops of short-cycle cellulosic biomass from land left uncultivated between regular cropping seasons"; or a combination thereof.
- 24) In cases where project activities rely on "cover crops of short-cycle cellulosic biomass from land left uncultivated between regular cropping seasons" as feedstock, the following criteria shall be met:
 - a. Compliance with definition of "cover crops of short-cycle cellulosic biomass": If cover crops of short-cycle cellulosic biomass are used, compliance with the definition of cover crops of short-cycle cellulosic biomass as described above shall be verified by the DOE during validation (on the basis of sustainable biomass availability surveys) and during verification of each CPA (on the basis of the monitoring protocol, which shall include all types of biomass used in a particular CPA).
 - b. Compliance with the requirement that cover crops of short-cycle cellulosic biomass is to be from "land left uncultivated between regular cropping seasons" as defined above: This criteria shall be verified by the DOE during the verification phase of each CPA on the basis of official records of the last three years prior to the start of the project activity (kept by local authorities or other government entities) demonstrating that such cover crops of short-cycle cellulosic biomass are sourced only between regular main cropping seasons and confirming that no food crops were normally grown during such periods.
 - c. Confirmation, at both the validation and verification stages, respectively, by the DOE, that cover crops of short-cycle cellulosic biomass prices do not exceed food crop prices through a comparative analysis of food crop yields per hectare and prevailing market prices versus cover crops of short-cycle cellulosic biomass yields per hectare and their associated prices. The comparison shall be made as per the monitoring plan and based on publicly available information on regional food crop

market prices.

The methodology revision in the context of the proposed PoA as a concrete example

In order to ensure compliance with the additional feedstock definition of “cover crops of short-cycle cellulosic biomass from land left uncultivated between regular cropping seasons”, the same shall be substantiated with official land usage pattern records available at government level, e.g. Taluk/Block level records from the Indian Government Department of Revenue or Agriculture in the context of this PoA.

The PoA proposes to source cover crops of short-cycle cellulosic biomass only from land left uncultivated between regular cropping seasons. In the specific case of the proposed PoA in India, land records are prepared by Village Accountant Officers (or VAOs) and maintained at Taluk/Block level. These records are updated every year and submitted to the Agriculture & Revenue Departments. The information contained in these records is used by the Department of Agriculture for land use planning, agricultural production details and other related activities. Examples of some of the details that can be found in these land use records are: crop-wise area under rain-fed agriculture, crop-wise area under irrigation, area sown, yield data, cropping cycle details (including the cropping period) etc. for all crops. This data is available on request at Taluk/Block level and shall be the basis to demonstrate compliance with the request for revision in the context of the proposed PoA.

Through reviewing the previous years’ records as well as fresh records during the project period, it will be feasible to objectively verify the fact that cover crops of short-cycle cellulosic biomass is being sourced from land left uncultivated between regular cropping seasons.

Recommendation by the SSC WG:

Please use the space below to provide amendments/change (in your expert view, if necessary).

Please refer to paragraph 7 of the meeting report of the SSC WG 24 (http://cdm.unfccc.int/Panels/ssc_wg).

Answer to authors of query by the SSC WG:

Please use the space below to provide answer to the authors of the above query.

The small-scale working group of the CDM Executive Board would like to thank the author for the submission.

The SSC WG agreed that the following issues need to be addressed by the project proponent before this revision can be recommended for approval.

Applicability conditions

The current limitation in the methodology with regard to the type of land for sourcing biomass have been included in order to avoid the considerations of shift of pre-project activities. The project proponent should further clarify why, by introducing the new proposed category (“cover crops of short-cycle cellulosic biomass from land left uncultivated between regular cropping seasons”), those considerations could also be avoided.

It should be noted that by introducing a new crop in a land left uncultivated between regular cropping seasons, the total production cycle could be affected (e.g., the yield of other crops could be affected). The definition provided should be revised in order to ensure that these kinds of impacts are taken into account.

The methodology has to specify how the compliance of the new condition proposed for the land (land left uncultivated between regular cropping seasons) could be demonstrated in the PDD and validated by the DOE. The project proponent may assess whether additional criteria would be needed for this new type of land use classification.

The project proponent may wish to clarify whether the cover crops from land left uncultivated between regular cropping seasons shall be restricted to “short-cycle cellulosic biomass”, or if any other short-cycle crop could be allowed.

Project boundary

The project boundary should be expanded to cover the plantation sites. The biomass should be sourced from the plantations sites included in the boundary. These conditions are required in order to assess the compliance with the new applicability condition for the land, and also to collect the data required to calculate the project emissions related with cultivation.

Project emissions

The project proponent has to assess if the project emissions resulting from cultivation of the new type of crops proposed (e.g., soil carbon losses, irrigation and fertilizer use) are covered in the General guidance on leakage in SSC biomass project activiteis” or if additional provisions have to be provided in the methodology.



Signature of SSC WG Chair

(Peer Stiansen)

Date: 19/02/2010



Signature of SSC WG Vice-Chair

(Hugh Sealy)

Date: 19/02/2010

Information to be completed by the secretariat

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