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:	04 - 06 July 2007
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Urea Offset Programmes for Inoculants Applications
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	Proposal for a new SSC methodology
Name of the authors of the query:	Institution: TUEV SUED (manja.welzel@tuev-sued.de; Werner.betzenbichler@tuev-sued.de; Javier.castro@tuev-sued.de

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.

There are no existing small scale methodologies that can be used to evaluate emission reduction that are likely to emanate from programmes that encourage the application of inoculant on agricultural land that otherwise would have been fertilized using urea. The submission relates to proposing a new methodology that comprises of technologies and activities that encourage reduced use of urea fertilizer in crop growing.

By replacing the urea that would have been used as fertilizer by the application of inoculants on the agricultural land CO_2 emissions during the production of the urea as well as direct N_2O emissions from the soil during the application of the urea will be avoided.

Project activity emissions will include: CO_2 emissions during the production of the inoculant at the inoculant production facility; and direct N_2O emissions from the soil during the application of the inoculant. In addition, there will be leakage emissions attributable to the production of the inoculant that are not directly attributable to the production facility.

Emission reduction will occur as the difference between the baseline emissions, the project emissions and leakages.

The main aspects of the methodology are summarized below.

Technology / Measure

This category comprises programmes that encourage the application of inoculant on agricultural land that otherwise would have been fertilized using urea. Only one crop type is allowed to be grown on the agricultural land. The aggregate emission reductions saved by a single project may not exceed the equivalent of 60,000 t CO_2 per year.

Applicability condition(s)

Not specifically elucidated in the submission.

Baseline scenario

Baseline options were not discussed in the submission

Baseline emissions

Baseline emissions consist of a) CO_2 emissions from urea production and b) direct N_2O emissions from the soil from urea application.
The baseline is the amount of urea ("urea baseline") that each farmer in the programme would have applied otherwise to grow the crop.
The urea baseline per each farmer i in the programme per the classified land area j (in t) is calculated as follows:

$$UB_{i,j} = ha_{i,j} * UAR_{i,j} \quad (1)$$

Where:
$ha_{i,j}$ is the area of land where the inoculant is applied by farmer i in the classified land area j in the programme (in ha)
$UAR_{i,j}$ is the average urea application rate (in t/ha) applied by farmer i in the classified land area j in the recent three growing seasons before joining the programme

The emissions baseline in the programme (in t CO_2e) is calculated as follows:

$$BE = \Sigma_i\Sigma_j (UB_{i,j} * 0.420 + ha_{i,j} * EF_{N2O,UAR,i,j} * 310) \quad (2)$$

Where:
Σ_i is the sum of farmers i which apply inoculant in the programme
Σ_j is the sum of classified land area j where inoculant is used in the programme
$UB_{i,j}$ is the urea baseline per each farmer i in the programme (in t)
0.420 is the emission factor from the production of urea (in t CO_2e/t urea)
$EF_{N2O,UAR,i,j}$ is the emission factor from urea application that conservatively corresponds to $UAR_{i,j}$ of farmer i on the classified land area j (in t N_2O/ha)
$ha_{i,j}$ is the area of land where the inoculant is applied by farmer i in the classified land area j in the programme (in ha)
$UAR_{i,j}$ is the average urea application (in t/ha) applied by farmer i in the classified land area j in the recent three growing seasons before joining the programme

Project emissions
Project activity emissions consist of a) CO_2 emissions due to the production of the inoculant at the inoculant production facility and b) direct N_2O emissions from the soil due to inoculant application

Project activity emissions in the programme (in t CO_2e) are calculated as follows:

$$PE = \Sigma_i Q_i * EF_{CO2,PROD} + \Sigma_i\Sigma_j ha_{i,j} * IAR_{i,j} * EF_{N2O,IAR,i,j} * 310 \quad (3)$$

Where:
Q_i is the amount of inoculant applied by each farmer i in the programme (in number of rhizobia bacteria)
$EF_{CO2,PROD}$ is the emission factor from production of inoculant that is used in the programme (in t CO_2/ number of rhizobia bacteria)
Σ_i is the sum of farmers i which apply inoculant in the programme
Σ_j is the sum of classified land area j where inoculant is used in the programme
$ha_{i,j}$ is the area of land where the inoculant is applied by farmer i in the classified land area j in the programme (in ha)
$IAR_{i,j}$ is the average inoculant application rate (in number of rhizobia bacteria/ha) applied by farmer i in the classified land area j in the programme
$EF_{N2O,IAR,i,j}$ is the emission factor from inoculant application that conservatively corresponds to $IAR_{i,j}$ of farmer i on the classified land area j in the programme (in t N_2O/ha)

Leakage
Any emissions attributable to the production of the inoculant that are not directly attributable to the production facility where the alternative input is produced shall be accounted for as leakage (LE).

Emission Reductions
The emission reduction shall be calculated using the following equation:

$$ER = BE – PE - LE \quad (4)$$

Recommendation by the SSC WG :

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

Please refer to Paragraph 13 of the meeting report of the SSC WG 11 (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 principle behind the emission reduction claim by this proposed new methodology is plausible. The SSC WG agreed that before this submission can be further considered for recommendation, there will be a need to get a feedback from the author on the issues listed below;

1. There is a need to provide more guidance about the applicability of the methodology. The submission is silent about when the methodology is applicable and when it is not. Such a guidance will be useful for the transparent use of the methodology;
2. The underlying project will involve the application of inoculant in multiple farming plots, which in the baseline had been applying urea as fertilizer. A key issue in the transparent application of this methodology is clear monitoring to ensure that activities are actually carried out. This was mentioned in passing in the submitted methodology. It is important that a cost-effective and simple monitoring scheme should be part of this new methodology. This should be explicitly spelt out;
3. It is known that the leguminacea plants are able to associate with rhizobia microorganisms that are capable of fixing atmospheric nitrogen. The methodology as currently proposed seems to disregard this natural capability of such plants and attributes all nitrogen fixation in the project scenario to the inoculation procedure. In other words, it is considered that in the absence of the project scenario, no rhizobia bacteria would be encountered in the cultivated land. This natural tendency should be addressed in the methodology;
4. The methodology assumes that the use of Urea is totally abandoned in the project scenario, but no means to monitor this is provided. In fact, the use of urea may be abolished in the project scenario, but other substitutes may be used instead, for example, organic fertilizers, sludges etc, or even other chemical fertilizers, like ammonium phosphate, besides the inoculation procedure;
5. The methodology assumes that urea use in the baseline is the minimum or optimal amount of application, that is, before the project there was no excess of nitrogen fertilizer use in the crop area. There is no method to verify that the amount of urea used before the project could be reduced, even in the absence of the adoption of inoculation;
6. The methodology does not have a procedure to ensure that excess application of inoculants is avoided. For example, it may happen that in the project scenario, with no use of urea, and with the inoculation of a too large number of rhizobia, more atmospheric nitrogen is fixed than necessary. If the soil and other natural conditions already provide at least part of the nitrogen necessary for the plants, and if the inoculation is practiced in excess, there will be more nitrogen fixed than necessary, and the excess nitrogen may be exported, out of the boundary;
7. New crop areas developed to produce soybean where a CDM project activity is being proposed might be causing leakages (e.g. from shift of pre-existing activities in the same land area). It is known that the area for soybean crops is usually expanded rapidly in many non-annex 1 countries to attend to the increase demand for this commodity and also for bio-diesel and other applications. It is not clear how this issue is addressed;
8. The applied rhizobia inoculants may become active outside the crop area, or after the crop area is abandoned or changed to another crop activity or land use (within or after the crediting period). Also, the inoculated rhizobia in one year may remain active for the next years, making the inoculation in the coming years less effective than in the first years, or leading to an excess of nitrogen, exported to the

surroundings. These effects will correspond to a leakage;

9. The draft submission seems to some inconsistencies in its formulation. For example, the factor EFN_2O, IAR,i,j is measured as tN_2O/ha, but the factor IARi,j has units of number of rhizobia bacteria/ha, and the product of both will result in inconsistency of the resulting units;
10. In the monitoring, a classification is given for the land areas j, but no guidance is given in how this classification can be used to obtain the average inoculant application rate (IARi,j) or the emission factor for urea application (baseline) and inoculant application (project);
11. Also in the monitoring part, it is stated that the N_2O emission factors for urea application (baseline) and inoculant (project) will be monitored during the crediting period. This means that these parameters are varying with time (for each year "y" during the crediting period). Nevertheless, no guidance is given in the methodology on how to monitor these factors;
12. The leakage paragraph is unclear. "Any emissions attributable to the production of the inoculant that are not directly attributable to the production facility where the alternative input is produced shall be accounted for as leakage". This is too generic, no guidance is given on what kind of leakage is accounted for, and how to monitor it, leading to non auditable conditions for the requisite;

It is clear from the above there exist many areas requiring elaboration before this methodology can be recommended. The issues above are only examples and may not cover all the uncertainties in such a proposal. The SSC WG is seeking expert inputs on some of the issues identified, however the author of the submission is encouraged to provide additional inputs to guide the consideration of the methodology for recommendation to the Board.

Signature of SSC WG Chair ……..

Date: 06/07/2007 *(Ulrika Raab)*

Signature of SSC WG Vice-Chair ……..

Date: 06/07/2007 *(Richard Muyungi)*

Information to be completed by the secretariat	
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