DET NORSKE VERITAS

VCS Methodology Element Assessment Report as Second Validator

Adoption of Sustainable Agricultural Land Management

Report for World Bank

DNV report number: 2011-9480
Revision 01

DET NORSKE VERITAS

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VCS METHODOLOGY ELEMENT ASSESSMENT REPORT

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Name of Methodology: Adoption of Sustainable Agricultural Land Management
Version: 01
Assessment Phases:
☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues
Assessment Status
☐ Corrective Actions Requested
☐ Clarifications Requested
☒ Full Approval by DNV
☐ Rejected

In summary, it is DNV's opinion that the proposed VCS methodology element "Adoption of Sustainable Agricultural Land Management" as described version 7 dated 28 September 2011, meets all relevant VCS requirements for VCS methodology elements. Therefore, DNV recommends the methodology element for approval and requests that VCSA approve the methodology element.

Report No.: 2011-9480	Subject Group: Environment
Report title: Adoption of Sustainable Agricultural Land Management	
Work carried out by: Gordon Smith, Kyle Silon	
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Abbreviations

ABMS	Activity Baseline and Monitoring Survey
A/R	Afforestation/Reforestation
AFOLU	Agriculture, Forestry and Other Land Use
ANSI	American National Standards Institute
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CL	Clarification Request
CO_2	Carbon Dioxide
DNV	Det Norske Veritas
FSC	Forest Stewardship Council
GHG	Greenhouse Gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
ME	Methodology Element
MED	Methodology Element Documentation
NCV	Net Calorific Values
PD	Project Document
ROA	Real Option Analysis
SCS	Scientific Certification Systems
tCO_2e	Tons CO_2 Equivalent
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit

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1 ASSESSMENT STATEMENT

Det Norske Veritas (U.S.A.), Inc has performed the second assessment of the proposed Verified Carbon Standard (VCS) methodology element, "Adoption of Sustainable Agricultural Land Management." The assessment was performed on the basis of VCS criteria for methodology development.

The review of the methodology element documentation and the subsequent follow-up interviews has provided DNV with sufficient evidence to determine the fulfillment of the stated criteria.

The methodology element (ME) was prepared based on the requirements of VCS Version 3, Version 3.1 and the Methodology Approval Process, Version 3.1.

The methodology element belongs to the sectoral scope of Agriculture, Forestry, Land Use.

In summary, it is DNV's opinion that the methodology element "Adoption of Sustainable Agricultural Land Management," as described in the Methodology Element Documentation (MED), version 7, dated 28 September 2011 meets all relevant VCS requirements for VCS methodology elements. Therefore, DNV recommends that VCSA approve the methodology element.

2 INTRODUCTION

The World Bank has commissioned Det Norske Veritas (U.S.A.), Inc (DNV) as the second validator to perform an assessment of the methodology element "Adoption of Sustainable Agricultural Land Management." This report summarizes the findings of the assessment of the methodology element, performed on the basis of VCS criteria for methodology elements. VCS criteria refer to VCS Version 3 and the subsequent VCS Program Normative Documents /2//3/.

3 METHODOLOGY

The assessment consisted of the following three phases:

1. A desk review of the new methodology.
2. Follow-up interviews.
3. Resolution of outstanding issues and the issuance of the final assessment report and opinion.

The following sections outline each step in more detail.

3.1 Desk Review of the New Methodology

The documentation that was reviewed during the assessment is shown below:

/1/	World Bank, Methodology element documentation "*Adoption of Sustainable Agricultural Land Management*," version 7, dated 28 September 2011 (and previous versions)
/2/	VCSA, *VCS Requirements Document: VCS Standard - VCS Version 3* , 15 July 2011, v3..
/3/	VCSA, *VCS Procedural Document: Methodology Approval Process*, 15 July 2011, v3.1.
/4/	VCSA, *Agriculture, Forestry and Other Land Use Projects (AFOLU) Requirement*, 8 March, 2011, v3.0.
/5/	VCSA, *AFOLU Non-Permanence Risk Tool*, 8 March 2011, v3.0.
/6/	VCSA, *VCS Requirements Document:VCS Program Guide- VCS Version 3*, 8 March 2011, v3.0.
/7/	World Bank BioCarbon Fund, *Crop Production and Activity Baseline and Monitoring Survey Guideline for Sustainable Agric ultural Land Management (SALM) practices,* 19 April, 2010.
/8/	CDM EB, "Combined tool to identify the baseline scenario and demonstrate the additionality in A/R CDM project activities."
/9/	CDM, "Estimation of changes in the carbon stocks of existing trees and shrubs within the boundary of an A/R CDM project activity."
/10/	CDM, "Estimation of direct nitrous oxide emission from nitrogen fertilizer."

/11/	CDM, "General Guidelines for Sampling and Surveys for Small-Scale CDM Project Activities."
/12/	CDM, "Simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grasslands or croplands AR-AMS0001."
/13/	IPCC, *2006 IPCC Guidelines on National GHG Inventories.*

3.2 Follow-up Interviews

	Date	Name	Organization	Topic
/14/	May - June 2011	Neeta Hooda	World Bank	1. Methodology element's eligibility criteria. 2. Baseline approach and additionality. 3. Project boundary. 4. Emissions, including leakage. 5. Monitoring, data and parameters.
/15/	May - June 2011	Rama Reddy	World Bank	
/16/	May - June 2011	Neil Bird	Joanneum Research	
/17/	May - June 2011	Giuliana Zanchi	Joanneum Research	

3.3 Resolution of Outstanding Issues

The objective of this phase of the assessment was to resolve any outstanding issues that needed to be clarified prior to DNV's positive conclusion on the methodology element. The assessment findings relate to the methodology element as documented and described in the initial MED /1/.

In order to ensure transparency, the issues raised and the ME developer's response are documented in Appendix A.

Findings established during the assessment can either be seen as a non-fulfillment of VCS criteria or where a risk to the fulfillment of ME objectives has been identified. Corrective Action Requests (CARs) are issued where:

- Mistakes have been made that have a direct influence on the methodology application.
- VCS-specific requirements have not been met.

A Clarification Request (CL) may be used where additional information is needed to fully clarify an issue.

3.4 Internal Quality Control

The assessment report underwent a technical review before DNV approved the methodology element. The technical review was performed by a qualified technical reviewer in accordance with DNV's qualification scheme.

3.5 Assessment Team

Listed below are the members of the assessment team, their roles, and the nature of their involvement.

Role/Qualification	***Last Name***	***First Name***	***Type of involvement***					
			Desk review	Interviews	Reporting	Supervision of work	Technical review	Expert input
Project Manager	Silon	Kyle		√		√		
VCS Validator	Smith	Gordon	√	√	√			√
Technical Reviewer	Kapambwe	Misheck Chomba					√	

4 ASSESSMENT FINDINGS

The findings of the assessment are stated in the following sections. The final assessment findings relate to the methodology element as documented and described in the revised MED.

4.1 Applicability Conditions

The eligibility criteria for the methodology element are clearly defined in the MED. The eligibility criteria were defined as shown below /1/:

- Land is either cropland or grassland at the start of the project.
- The land is degraded and will continue to be degraded or continue to degrade.
- The area of land under cultivation in the region is constant or increasing in absence of the project.
- Forest land, as defined by the national CDM forest definition, in the area is constant or decreasing over time.
- There is no significant increase in greenhouse gas emissions as a result of an increase in the number of livestock.
- There is no significant displacement of agricultural residues or manure from outside the project boundary to within the project boundary.
- There is no significant increase in the use of fossil fuels for agricultural management (i.e., use of farm machinery to cultivate, fertilize, harvest).
- There is no significant increase of use of fossil fuels for cooking and heating as a result of the displacement of manure and/or residuals from the household to the agricultural land as a result of the project.
- There must be studies (for example; scientific journals, university theses, local research studies or work carried out by the project proponents) that demonstrate that the use of the Roth C model is appropriate for: (a) the IPCC climatic regions of 2006 IPCC AFOLU Guidelines, or (b) the agroecological zone (AEZ) in which the project is situated.

4.2 Project Boundary

The project's physical boundary is clearly and properly defined as all lands that are directly affected by the proposed sustainable land management activities, and are under the control of the project participants. The sources and types of gases included are also clearly and properly defined in the MED /1/; the justification to include or exclude certain types of gases is reasonable.

4.3 Procedure for Determining the Baseline Scenario

The baseline scenario is determined using the "Combined tool to identify the baseline scenario and demonstrate the additionality in A/R CDM project activities"/8/, not including the portions of the tool that reference the eligibility of lands for afforestation/reforestation (A/R) projects. DNV can confirm that the use of this tool to is appropriate.

4.4 Procedure for Demonstrating Additionality

Additionality is determined using the "Combined tool to identify the baseline scenario and demonstrate the additionality in A/R CDM project activities" /8/, not including the portions of the

tool that reference the eligibility of lands for A/R projects. DNV can confirm that the use of this tool to is appropriate.

4.5 Emissions

DNV checked all of the assumptions for baseline emissions, project emissions, and leakage and was able to confirm that they are acceptable. All the equations and parameters for calculating baseline emissions, project emissions, and leakage can also be confirmed as being proper.

4.5.1 Baseline Emissions and Removals

The baseline emissions consist of emissions from the application of nitrogen fertilizer, biomass burning, and removals due to changes in woody perennials. Steps to determine the baseline emissions are described below:

- Baseline emissions from nitrogen fertilizer are calculated using the latest version of the CDM A/R Working Group Tool "Estimation of direct nitrous oxide emission from nitrogen fertilizer." /10/
- Baseline emissions from the burning of biomass are calculated using the tool "Estimation of non-CO_2 emission from the burning of crop residues." /1/
- Baseline removals from changes in woody perennials are calculated uses the latest version of the CDM A/R Working Group Tool "Estimation of changes in the carbon stocks of existing trees and shrubs within the boundary of an A/R CDM project activity."/9/

In addition to calculating the baseline emissions/removals identified above, the project proponent is required to:

- Record the area under N-fixing species prior to project implementation.
- Estimate the soil organic carbon density to a depth of 30 cm, at equilibrium in identified management practices on cropland and grassland using analytical models that have been accepted in scientific publications.

Note that emissions from manure application and the use of N-fixing species, and removals from changes in soil organic carbon are not included in the baseline. An applicability condition of the methodology is that there shall be no significant displacement of manure from outside the project boundary to inside the project boundary. Due to limits on the importing of manure from outside the project boundary and the change in animal population, emissions from manure applications are not expected to change. Applicability conditions also limit projects to lands that are under agricultural pressure and are degrading, so the elimination of removals due to soil organic carbon is conservative. Baseline emissions from N-fixing species are not included, as emission reductions are only calculated for the introduction of N-fixing species to new areas.

4.5.2 Project Emissions and Removals

The project emissions and removals consist of emissions from the application of nitrogen fertilizer, the increased use of N-fixing species, biomass burning, and removals due to changes in woody perennials and changes in soil organic carbon. Steps to determine the project emissions and removals are described below:

- Project emissions from nitrogen fertilizer are calculated using the latest version of the CDM A/R Working Group Tool "Estimation of direct nitrous oxide emission from nitrogen fertilizer." /10/
- Project emissions from the increased use of N-fixing species are calculated if the area cropped with N-fixing species increases by more than 50%.
- Project emissions from the burning of biomass are calculated using the tool "Estimation of non-CO_2 emission from the burning of crop residues." /1/
- Project removals from changes in woody perennials are calculated using the latest version of the CDM A/R tool "Simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grasslands or croplands AR-AMS0001."/12/
- Removals due to changes in soil organic carbon are calculated as follows:

Equilibrium soil carbon stocks under baseline practices are modeled using the Roth C soil carbon model and project-specific values for soil clay content, topsoil thickness, decomposability of incoming plant material, proportion vegetative matter cover by month, monthly mass of carbon input, average monthly temperature, average monthly precipitation, and average monthly evapotranspiration. The Roth C model is run again to equilibrium using values for the project activity. Soil carbon stock is assumed to linearly move from the baseline equilibrium to the project equilibrium in 20 years, unless there is relevant data showing a different change rate or duration. Removal amounts are calculated as follows:

$PRS_t = (PS_t – PS_{t-1}) * (44/12)$

Where

PRS_t	=	Estimate of project removals due to changes in soil organic carbon in year t
PS_t	=	Estimate of project SOC in year t
PS_{t-1}	=	Estimate of project SOC in year t-1

PSt is calculated as follows

$$PSt = \frac{1}{D}\left(\sum_{t-D+1}^{t} PSequil, t * \Delta t \right)$$

Where:

PS_t	=	Estimate of project SOC in year t
D	=	the transition period required for SOC to be at equilibrium after a change in land use or management practice
PS_{equil}	=	Estimate of project SOC in equilibrium year t.
Δt	=	Time

PS_{equil} is calculated as follows:

$$PSequil,t = \left(\sum_{Mc}^{t} PAc,mc,t * SOCc,mc,t \right) + \left(\sum_{Mg}^{t} PAg,mg,t * SOCg,mg,t \right)$$

Where:

$PS_{equil,t}$	=	Project SOC in equilibrium year t
$PA_{c,mc,t}$	=	Project areas in cropland with management practice, mc, year t
$SOC_{c,mc,t}$	=	Soil organic carbon density at equilibrium for cropland, to a depth of 30 cm, with management practice, mc, at year t
m_c	=	An index for cropland management types,
$PA_{g,mg,t}$	=	Project areas in grassland with management practice, mg, year t
$SOC_{g,mg,t}$	=	Soil organic carbon density at equilibrium, to a depth of 30 cm, for grassland with management practice, mg, at year t
m_g	=	An index for management types

Reliability of the model is key to this methodology. The methods for limiting cots by using input factors derived from sources other than the project would not be acceptable if these non-project inputs result in significant errors in the emissions and emission reductions estimated by modeling. In particular, the clay content of soil has a significant effect on the amount of carbon that may be sequestered. DNV performed a number of model runs, with different soil clay proportions, initial soil carbon starting conditions, and residue input rates. Within the range of 95% of the soil clay content sample values, the variation in the proportion of clay in the soil had minimal effect on modeled amounts of carbon sequestration. Investigation of several soil data sets suggests that variability in topsoil thickness will cause minimal error in soil carbon stock change estimates because an applicability condition of the methodology is that project lands be degraded, and this degradation is likely to result in relatively uniformly low carbon stocks through the soil depth addressed by projects.

The approach for quantifying project emissions and removals is deemed by DNV to be appropriate and adequate.

4.5.3 Leakage

The methodology identifies five potential sources of leakage, including:

- Displacement of biomass from outside to inside the project boundary causing the depletion of soil organic carbon outside the project boundary.
- Displacement of manure from outside to inside the project boundary causing an increase in the use of inorganic fertilizers or an increase in the amount of fossil fuel for cooking outside the project boundary.

- Increase in the use of fuel wood from non-renewable sources for cooking and heating purposes due to the decrease in the use of manure and/or residuals as an energy source.
- Increase in the use of fossil fuel for cooking and heating purposes due to the decrease in the use of manure and/or residuals as an energy source.
- Increase in the combustion of fossil fuel by vehicles due to an increase in agricultural produce shipped to market as a result of the adoption of sustainable land management practices.

With one exception, these sources of leakage are excluded from the calculation of net emission reductions as they are limited by the applicability conditions of the methodology. The exception is emissions associated with the increased use of non-renewable biomass for cooking. DNV can confirm this was acceptable, as justified within the methodology.

4.5.4 Quantification of Net Greenhouse Gas Emission Reductions

The net greenhouse gas (GHG) emission reductions are calculated by subtracting the project emissions and removals from the baseline emission and removals.

The estimation of net anthropogenic GHG removal by sinks is made using:

$$\Delta Rt = BEt - PEt - LNRBt$$

Where

ΔRt	=	Estimate of net anthropogenic GHG emissions and removals in year t, tCO_2e.
BEt	=	Estimate of actual net GHG emissions and removals in year t, tCO_2e.
PEt	=	Baseline emissions and removals in year t, tCO_2e.
$LNRB$	=	The leakage from a switch to non-renewable biomass use.

DNV can confirm that this approach was acceptable and that the approach has been clearly described.

4.6 Monitoring

The project proponent is required to conduct an Activity Baseline and Monitoring Survey (ABMS) at the start of the project, according to the guidelines for sampling and survey design set out in the CDM tool "General Guidelines for Sampling and Surveys for Small-Scale CDM Project Activities." The MED clearly defines the data that must be recorded for each type of management practice. DNV can confirm that the requirements outlined in the MED are acceptable.

The activity parameters to be monitored for emission reduction calculations are defined appropriately and clearly listed in the MED, which will ensure that the emission reductions from the project activity be estimated properly. The parameters to be monitored and the corresponding monitoring methods are outlined in Section 4.7.

Quality assurance measures have also been properly prescribed for all major monitoring activities to further ensure the accuracy and reliability of the emission reduction estimates.

4.7 Data and Parameters

Both monitored and unmonitored data and parameters used in the emissions calculations are defined in the MED clearly and appropriately, making it possible for the emission reductions to be estimated and verified.

The data unit, description, and sources of data for each parameter are described clearly. Baseline and project parameters that are included in the "Simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grasslands or croplands AR-AMS0001"/X/ must be collected and archived. Additional baseline parameters that must be collected and archived are listed below:

Baseline Parameters	**Description**	**Monitoring Frequency**	**Source**
$BSN_{t=0}$	Synthetic fertilizer use	Project start	ABMS
$Crop_{i,t=0}$	Harvested annual dry matter yield for crop i	Project start	ABMS
$Area_{i,t=0}$	Total annual area harvested of crop i or n-fixing trees i	Project start	ABMS
$Areaburnt_{i,t}$	Annual area of crop i or n-fixing trees i burnt	Project start	ABMS
$MB_{C,t=0}$	Mass of crop residues burnt	Project start	ABMS
$MB_{G,t=0}$	Mass of grasslands residues burnt	Project start	ABMS
C_F	Combustion factors that depend on vegetation type	Project start	National or regional studies
$BA_{C,mc,t=0}$	Baseline areas in cropland with management practice, mC	Project start	ABMS
$SOC_{C,mc,t=0}$	Soil organic carbon density, to a depth of 30 cm, at equilibrium for cropland with management practice, m_C	Project start	Modeled
$BP_{C,mc,t=0}$	Baseline production in cropland per month with management practice, m_C	Project start	ABMS
$BR_{C,mc,t=0}$	Baseline fraction of production returned as residuals per month in cropland with management practice, m_C	Project start	ABMS
$BM_{C,mc,t=0}$	Baseline manure input in cropland per month with management practice, m_C	Project start	ABMS
$BCC_{C,mc,t=0}$	Baseline cover crop flag per month in cropland per month with management practice, m_C	Project start	ABMS

$BA_{G,mg,t=0}$	Baseline areas in grassland with management practice, m_G	Project start	ABMS
$SOC_{G,mg,t=0}$	Soil organic carbon density, to a depth of 30 cm, at equilibrium for grassland with management practice, m_G	Project start	Modeled
$BP_{G,mg,t=0}$	Baseline production in grassland per month with management practice, m_G	Project start	ABMS
$BR_{G,mg,t=0}$	Baseline fraction of production returned as residuals per month in grassland with management practice, m_G	Project start	ABMS
$BM_{G,mg,t=0}$	Baseline manure input in grassland per month with management practice, m_G	Project start	ABMS
$BCC_{G,mg,t=0}$	Baseline cover crop flag per month in grassland per month with management practice, m_G	Project start	ABMS
$Temp_m$	Average temperature per month	Project start	Data relevant to the project area
$Prec_m$	Average precipitation per month	Project start	Data relevant to the project area
$Evap_m$	Average evapotranspiration per month	Project start	Data relevant to the project area

Additional project parameters that must be collected and archived are listed below:

Project Parameter	**Description**	**Monitoring Frequency**	**Source**
PSN_t	Synthetic fertilizer use per year	Annually	ABMS
$PA_{C,t}$	Areas in cropland	Annually	ABMS
$PA_{G,t}$	Areas in grassland	Annually	ABMS
PF_t	The price of inorganic fertilizer	Annually	National or regional studies
$Crop_{i,t}$	Harvested annual dry matter yield for crop i	Annually	ABMS
$Area_{i,t}$	Total annual area harvested of crop *i* or n-fixing	Annually	ABMS

	trees *i*		
$Areaburnt_{i,t}$	Annual area of crop i or n-fixing trees i burnt	Annually	ABMS
$MB_{C,t}$	Mass of crop residues burnt	Annually	ABMS
$MB_{G,t}$	Mass of grasslands residues burnt	Annually	ABMS
C_F	Combustion factors that depend on vegetation type	Project start	National or regional studies
$PA_{C,mc,t}$	Project areas in cropland with management practice, m_C	Annually	ABMS
$SOC_{C,mc,t}$	Soil organic carbon density, to a depth of 30 cm, at equilibrium for cropland with management practice, m_C	Every 5 years	Modeled
$PP_{C,mc,t}$	Project production in cropland per month with management practice, m_C	Annually	ABMS
$PR_{C,mc,t}$	Project fraction of production returned as residuals per month in cropland with management practice, m_C	Annually	ABMS
$PM_{C,mc,t}$	Project manure input in cropland per month with management practice, m_C	Annually	ABMS
$PCC_{C,mc,t}$	Project cover crop flag in cropland per month with management practice, m_C	Annually	ABMS
$PA_{G,mg,t}$	Project areas in grassland with management practice, m_G	Annually	ABMS
$SOC_{G,mg,t}$	Soil organic carbon density, to a depth of 30 cm, at equilibrium for grassland with management practice, m_G	Every five years	Modeled
$PP_{G,mg,t}$	Project production in grassland per month with management practice, m_G	Annually	ABMS
$PR_{G,mg,t}$	Project fraction of production returned as residuals per month in grassland with management practice, m_G	Annually	ABMS
$PM_{G,mg,t}$	Project manure input in grassland per month with management practice, m_G	Annually	ABMS
$PCC_{G,mg,t}$	Project cover crop flag per month in grassland per month with management practice, m_G	Annually	ABMS
$Temp_m$	Average temperature per month	Over the previous five years	Data relevant to the project

			area
$Prec_m$	Average precipitation per month	Over the previous five years	Data relevant to the project area
$Evap_m$	Average evapotranspiration per month	Over the previous five years	Data relevant to the project area
D	Transitions period	Every five years	National or regional studies

Finally, the leakage parameters that must be collected and archived are listed below:

Project Parameter	**Description**	**Monitoring Frequency**	**Source**
$B_{biomass, t}$ / $B_{fossilfuel, t}$	Quantity of biomass from outside the project of fossil fuel used in pace of the amount of biomass used in heating and cooking diverted to the agricultural system in the project.	Annually	ABMS
$f_{NRB,t=1}$	Fraction of biomass that comes from non-renewable sources	Project start	If data is available, calculated as per AMS I.E methodology If data is not available, $f_{NRB,}$= 1
$NCV_{biomass}$ / $NCV_{fossil\ fuel}$	Net calorific value of the non-renewable biomass that is substituted	Project start	IPCC defaults, National or regional studies
$EF_{projected\_fossilfuel}$	Emission factor for the projected fossil fuel consumption	Every five years	IPCC defaults, National or regional studies

Requirements for data and calculation reviews are clearly defined in the MED; these requirements are deemed proper by DNV to allow for uncertainties related to the emission reductions to be reduced in a reasonable manner.

4.8 Adherence to the Project-level Principles of the VCS Program

The MED was developed in line with the project-level principles of VCS Version 3, as elaborated above. It is also deemed by DNV that the principles of relevance, completeness, consistency, accuracy, transparency, and conservativeness are properly addressed in the MED.

4.9 Comments by Stakeholders

DNV reviewed the comments and responses, and is of the opinion that the methodology developer has taken due account of all comments submitted and that all of the responses from the project developer are adequate.

4.10 Comments by First Validator

Scientific Certification Systems (SCS) completed the first assessment of the proposed methodology on 4 February, 2011. SCS requested new information and identified opportunities for improvement and non-conformance during the validation of the methodology element. The World Bank has submitted all new information that was requested, and all CARs/CLs raised during the course of the first validation were closed prior to the second validation. DNV concurs with all comments and consequent revision by the methodology developer. SCS did recommend that DNV pay careful attention to the process of model parameterization based on data from agroecological regions. DNV further explored model parameterization through CAR 1 and CAR2 (see Appendix), and is convinced that the methodology meets all relevant VCS requirements. The first assessment by SCS concluded that the proposed VCS methodology element "Adoption of sustainable agricultural land management (SALM)," meets all relevant requirements of the VCS.

4.11 Evidence for DNV's Fulfillment of Eligibility Requirements

Det Norske Veritas (U.S.A.), Inc holds accreditation to perform validation for projects under sectoral scopes 3 (agriculture, forestry, other land use) under the American National Standards Institute (ANSI). DNV, therefore, is eligible under the VCS Program to perform assessments for the MED, which falls under the sectoral scope 3.

Furthermore, Gordon Smith, the lead validator on DNV's project team, is a VCSA-approved AFOLU expert.

APPENDIX A

RESOLUTION OF CORRECTIVE ACTION AND CLARIFICATION REQUESTS

Draft report clarifications and corrective action requests by validation team	Summary of response	Validation team conclusion
CAR 1 The methodology states that values for average monthly temperature, average monthly precipitation, and average monthly evapotranspiration for the baseline (section IV.1.2) and for the project (section IV.2.5) will be obtained for national or regional studies. Given that these factors can vary significantly between sites a few kilometers from each other, and can vary significantly from year to year, national or regional studies might not provide accurate data. The MED developers have to demonstrate that the national or regional studies for the above parameters can be accurate at the project level. Otherwise, the MED developers need to propose an alternate procedure for monitoring the temperature, precipitation and evapotranspiration for the project area.	Please see change in the attached methodology	The new text in section IV.1.1 requires that the weather data used to run the model be appropriate to the project area. CAR 1 is closed.
CAR 2 The Roth C model requires values for soil clay content and topsoil thickness. These numbers are physical conditions that are highly likely to vary significantly within the project boundary. Please specify a resolution for measurement of physical conditions to quantify the variability of the project area.	Data to check the functionality of the model was provided to DNV to do test runs to ascertain the implications from variability of soil thickness and soil clay content. DNV informed that CAR 2 is closed based on the information provided.	DNV performed a number of model runs, with different soil clay proportions, initial soil carbon starting conditions, and residue input rates. Within the range of 95% of the soil clay content sample values, the variation in the proportion of clay in the soil had minimal effect on modeled amounts of carbon sequestration. Investigation of several soil data sets suggests that variability in topsoil thickness will cause minimal error in soil carbon stock change estimates because an

Draft report clarifications and corrective action requests by validation team	Summary of response	Validation team conclusion
		applicability condition of the methodology is that project lands be degraded, and this degradation is likely to result in relatively uniformly low carbon stocks through the soil depth addressed by projects. CAR 2 is closed.
CAR 3 In Section IV.2.8 step 4, in the second to the last line on page 25, it appears that the number given as "50%" should be 30% to match the rest of the subsection.	Correction has been made in the methodology.	Correction has been made. CAR 3 is closed.
CL 1 Please check number sequence of footnotes and ensure that numbers are in sequence and that there is note text for each number.	The footnotes are in sequence. There are some that are for references to the CDM tools referred in the methodology and by clicking on these the reader can go the reference list at the end of the methodology.	Footnotes are numbered and endnotes are denoted with letters, eliminating the sequencing and referencing ambiguity. CL 1 is closed.
CL 2 Are the baseline soil carbon calculations in Section II, project sequestration in Section III, and the uncertainty analysis described in Section IV intended to be performed for multiple strata with different physical conditions? The methodology explicitly states that some variables will be calculated for each management practice m_c. The Roth C model requires use of decomposability of incoming plant material, proportion of vegetative matter cover by month, and monthly mass	Most of the clarification is related to CAR 2 and is addressed through that. However page 18 already now recommends that stratification at a minimum should consider crop management, clay content etc. Climatic variables have been added to the recommended list of variables for stratification.	The new language provides additional useful guidance to project developers, helping them avoid uncertainty deductions. CL 2 is closed.

Draft report clarifications and corrective action requests by validation team	Summary of response	Validation team conclusion
of carbon input. The values of these three variables are a function of management and will be different for different crops or different trees species and presumably will be stratified. The Roth C model requires clay content and topsoil thickness, and these numbers are physical conditions that are likely to vary significantly within the project boundary. The Roth C model also requires use of monthly temperature and monthly pan evaporation, and these values will be a function of weather and change from year to year. To limit uncertainty deductions, project developers are likely to stratify both soil physical characteristics and weather conditions.		

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