

VALIDATION OF THE “INDIA SUNDARBANS MANGROVE RESTORATION” PROJECT



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Summary:

This report describes the validation audit of the “India Sundarbans Mangrove Restoration” project (“the project”), a reforestation project located in India, against the VCS Version 3 and all applicable requirements therein. The validation was conducted by means of document review, follow-up interviews and site inspection, and the resolution of outstanding issues. The validation included: evaluating whether the information provided in the PD is accurate and whether the project complies with the requirements of the VCS rules and the applicable methodology. The project has applied the CDM methodology AR-AM0014 “Afforestation and reforestation of degraded mangrove habitats”, Version 3.0. As part of the validation 12 findings were raised: ten Non-Conformity Reports and two New Information Requests. These findings are described in Appendix A of this report. The validation was conducted by means of document review, follow-up interviews and site inspection, and the resolution of outstanding issues. The review of the project design documentation and the subsequent follow-up interviews and site inspection have provided SCS with sufficient evidence to determine the fulfilment of stated criteria. In summary, it is SCS’s opinion that the project activity “India Sundarbans Mangrove Restoration” as described in the PD, dated 10 June 2015, meets all relevant VCSA requirements for the VCS project and correctly applies the CDM methodology AR-AM0014 “Afforestation and reforestation of degraded mangrove habitats”, Version 3.0. Hence, the assessment team has no restrictions or uncertainties with respect to the compliance of the project with the validation criteria.

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1 INTRODUCTION

1.1 Objective

The purpose of the validation audit activity was to conduct an independent assessment of the India Sundarbans Mangrove Restoration ("the project") and its first instance ("the first instance") to determine whether the project complies with the validation criteria, as set out in the guidance documents listed in Section 1.2 of this report.

1.2 Scope and Criteria

In accordance with Section 4.3.4 of ISO 14064-3:2006, the scope was defined as follows:

- The project and its baseline scenarios;
- The physical infrastructure, activities, technologies and processes of the project;
- The GHG sources, sinks and/or reservoirs that are applicable to the project; and
- The types of GHGs that are applicable to the project.

In accordance with Section 5.3.1 of the VCS Standard, the criteria for validation was the VCS Version 3, including the following documents:

- VCS Standard Version 3.5 and other relevant requirements defined by VCSA.
- AFOLU requirements: VCS Version 3.4;
- AFOLU Non-Permanence Risk tool: VCS Version 3.2; and
- The CDM methodology CDM AR-AM0014 Version 3.0, which is approved for use under the VCS Program.

Unless otherwise indicated, the assessment was performed against the most recent version of the relevant VCS guidance document.

1.3 Level of Assurance

The validation report expresses a conclusion with a reasonable level of assurance about whether the reported net anthropogenic GHG removals data is free from material misstatement. SCS applied a materiality threshold of 5% with respect to omission or misstatements concerning reported quantities as per VCS Standard Section 5.3.1 4).

1.4 Summary Description of the Project

Project Proponents (Parties):	Livelihoods Fund
Title of project activity:	India Sundarbans Mangrove Restoration
Baseline and monitoring methodology	CDM AR-AM0014 Version 3.0

Location of the project activity	The proposed grouped project is located in coastal wetlands of India and aims to carry-out the restoration of more than 4,004 ha.
Project's crediting period:	31 July 2009 to 30 July 2039

2 VALIDATION PROCESS

2.1 Method and Criteria

The validation was performed through a combination of document review, interviews with relevant personnel and on-site inspections, as discussed in Sections 2.2 through 2.4 of this report. At all times, the project was assessed for conformance to the criteria described in Section 1.2 of this report. As discussed in Section 2.5, findings were issued to ensure that the project was in full conformance to all requirements.

The audit team created a sampling plan following a proprietary sampling plan workbook developed by SCS. Per Section 4.4.3 of ISO 14064-3:2006, the audit team identified possible risks of errors, omissions and misrepresentations with respect to the verification criteria. For each identified risk, the audit team assessed the likelihood of the material discrepancy occurring, the likelihood of the material discrepancy not being prevented or detected by the controls of the project the material discrepancy and the likelihood of the material discrepancy not being detected by the audit team. Sampling and data testing activities were planned to address any risk where the likelihood of a material discrepancy not being detected by the audit team was judged to be unacceptably high. The audit team then created a validation plan that took the sampling plan into account.

2.2 Document Review

The project description (version 5.0 dated 10 June 2015) and supporting documentation were carefully reviewed for conformance to the validation criteria.

The following documents provided by the project proponent have been used as direct sources of evidence for the validation conclusions:

Document name	Ref
NEWS & UNIQUE forestry and land use: <i>VCS-PD for project activity "India Sundarbans Mangrove Restoration" in India</i> , version 1.0 dated 26 January 2015 (first version received from the project proponent) and version 5.0 dated 10 June 2015	/1/
NEWS & UNIQUE forestry and land use Non-Permanence risk assessment report, version 3.0, 15 May 2015	/2/
Various entities. Signed contracts and agreements: - Memorandum of Understanding between NEWS and Danone. Signed 9 June 2010 - Contract between NEWS and Danone for the establishment of a Mangrove restoration project. Signed 7 July 2010. - Purchasing agreement including the transfer of any right to the carbon credits from NEWS to Danone. Signed 29 May 2011 - Amendment to purchasing agreement between NEWS, Danone and Livelihoods indicating that all rights on the project will be transferred from Danone to Livelihoods. Signed 28 November 2011. - Amendment to the MoU between NEWS, Danone and Livelihoods indicating that all rights and	/3/

Document name	Ref
obligations on the project will be transferred from Danone to Livelihoods. Signed 28 November 2011.	
- Carbone emission reduction collaboration agreement between NEWS and Livelihoods with the investment plan for implementation and operation of the project. Signed 29-1-2012. - Community carbon agreements signed with the Panchayats for the following plots: 4-M22-2; M22; 4-M17-1; 5-M17-1; M17_2; 4-S7-1; S7_2; S7_3; S7_4; S8	
NEWS & UNIQUE forestry and land use. ESRI Shapefiles • Project boundary including information on planting species; • Giri C, Ochieng E, Tieszen LL, Zhu Z, Singh A, Loveland T, Masek J, Duke N (2011). Status and distribution of mangrove forests of the world using earth observation satellite data. Global Ecology and Biogeography 20: 154-159 ; http://data.unep-wcmc.org/datasets/4	/4/
NEWS. Evidence of start date. Receipts of payment of plantation and seed collection. 28 September 2010.	/5/
Ministry of Environment and Forests – Government of India. Letter of Approval for the “India Sundarbans Mangrove Restoration”. 22 November 2012	/6/
NEWS & UNIQUE forestry and land use. GIS data and information: - ESRI Shapefiles with limits of Grouped Project - ESRI Shapefiles with limits of project boundary and land eligibility information - ESRI Shapefiles with location of Sampling Plots	/7/
NEWS & UNIQUE forestry and land use. Baseline carbon stocks spreadsheet and sampling plot data.	/8/
NEWS & UNIQUE forestry and land use. Ex-ante GHG removals calculations and ex-ante GHG calculations	/9/
Report of the Field Survey to Sunderban during 17th - 19th May, 2011 under Denone Project	/10/
Various financial information and data: - Livelihoods Fund: Minutes of the Board of Directors indicating updated business plan. 5 December 2013 - Livelihoods Fund: Minutes of the Board of Directors indicating updated business plan. 18 December 2014 - CACEIS Bank. Capital participation and current account status. 31 December 2013 - Livelihoods Fund: Cash flow spreadsheet	/11/
NEWS & UNIQUE forestry and land use. Standard Operating Procedures (SOPs): - Pilot Inventory Sampling Monitoring Plan. December 2014.	/12/
Livelihoods Fund. Management and financial plan of the NEWS Project. January 2015	/13/
Letter to The Director of Sundarban Biosphere Reserve (Department of Forests) attaching the financial and management plan of the project covering 50 years. 28 March 2015	/14/
H.J. RUITENBEEK RESOURCE CONSULTING LIMITED. Due Diligence Review. India: Restore Greenbelts in the Sundarbans Danone Fund for Nature (DFN) Wet Carbon Initiative 77081–100 Final Report. 5 July 2010	/15/
UNIQUE. Report on audit conducted on the plantation areas. Year 2014 audit. 1 April 2014.	/16/
Bahuguna, A. 2010. Restore ‘green belts’ in Sunderbans , thereby increasing biodiversity resources for continued sustainable existence of the community: First Observations.	/17/
Various evidences on plantation site selection and plantation monitoring:	/18/

Document name	Ref
- Pest and diseases database. 2015 - Degradation risks assessment database of years 2013 and 2014 - Various reports from coordinators regarding the implementation and state of plantations	
NEWS & UNIQUE forestry and land use. Participatory Rural Appraisal (PRA)	/19/

The following documents served as supporting documents in order to reach a validation conclusion and they relate to background documents and applicable methodologies, tools and standards:

Name of Document	Ref
CDM Executive Board: <i>Methodology</i> CDM AR-AM0014 "Afforestation and reforestation of degraded mangrove habitats", Version 3.0	/20/
CDM Executive Board: 'Combined tool to identify the baseline scenario and demonstrate additionality in AR CDM project activities' (version 1)	/21/
CDM Executive Board: 'Estimation of non-CO ₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0)	/22/
CDM Executive Board: 'Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities' (version 3.0.0)	/23/
CDM Executive Board: 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (version 4.1.0)	/24/
CDM Executive Board: 'Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity' (version 2.0.0)	/25/
CDM Executive Board: 'Calculation of the number of sample plots for measurements within A/R CDM project Activities' (version 2.1), Annex 15	/26/
CDM Executive Board: 'Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities' (version 01.0.0), Annex 28, EB65	/27/
VCSA: VCS standards: VCS Standard Version 3.5, 25 March 2015	/28/
VCSA: AFOLU Non-Permanence Risk tool: VCS Version 3.2, 4 October 2012	/29/
VCSA: 'Program Definitions: VCS Version 3.5', 8 October 2013	/30/
VCSA: AFOLU requirements: VCS Version 3.4, 8 October 2013	/31/
ISO 14064-3:2006: Greenhouse gases — Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions, First edition, 1 March 2006	/32/
ISO 14065:2007: Greenhouse gases — Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognitions, First edition, 15 April 2007	/33/
VCSA: <i>Validation and Verification Manual</i> . Version 3.0	/34/
Applicable legislation: - The Indian Forest Act, 1927 - National Forest Policy, 1988 - The West Bengal Protected Forests Rules - The Forest (Conservation) Act, 1980 with 1988 Amendments FCA-'80 - The Biological Diversity Act, 2002 (Act No. 18 of 2003) Other Acts - The Wildlife (Protection) Act 1972 and its Amendments with WL(P) Act Schedule	/35/

- The West Bengal Trees (Protection and Conservation in non-forest areas) Act, 2006	
ESRI : Change matters – On-line visor showing NDVI change between 1975 and 2010, http://changematters.esri.com/compare	/36/
- IPCC, 2003: <i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i> , prepared by the National Greenhouse Gas Inventories Programme, Jim Penman, Michael Gytarsky, Taka Hiraishi, Thelma Krug, Dina Kruger, Riitta Pipatti, Leandro Buendia, Kyoko Miwa, Todd Ngara (eds). Published: IGES, Japan. URL: http://www.ipcc-nggip.iges.or.jp/public/gpplulucf/gpplulucf.html	/37/
- IPCC (2006): <i>2006 IPCC Guidelines for National Greenhouse Gas Inventories, Prepared by the National Greenhouse Gas Inventories Programme</i> . Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds).Published: IGES, Japan	
- Including 2013 Supplement to the 2006 IPCC Guidelines for national Greenhouse Gas Inventories: Wetlands – Methodological guidance on organic and wet soils across IPCC land-use categories.	
Forest Carbon Partnership Facility: http://www.forestcarbonpartnership.org/fcp/	/38/
UN-REDD programme: http://www.un-redd.org/	/39/
United Nations Framework Convention on Climate Change (UNFCCC). Clean Development Mechanism (CDM) project database. http://cdm.unfccc.int/Projects/projsearch.html http://cdm.unfccc.int/Projects/Validation/index.html	/40/
CDM – NEWS Mangrove restoration PDD: http://cdm.unfccc.int/filestorage/O/L/V/OLVBWCH39FITE4M8DNZ26QPS5YUX70/PDD.pdf?t=bGI8bm45MDZufDA - FSPNfjieVtMhok_z32	/41/
The Gold Standard Foundation: Gold Standard project registry http://www.goldstandard.org/about-us/project-registry	/42/
Gomes Soares. M.L. et al. 2005. Above-ground biomass of mangrove species. E.C.Shelf Science	/43/
Komiyama et al. 2008. Allometry, biomass and productivity. Mangrove ecology. Aquatic Botany	/44/
McKee K.L. et al. 2000. Restoration of biogeochemical function in mangrove forests. Restoration Ecology	/45/
Smith, T.J. et al. 2006. Development of allometric relations for three . Wetlands Ecology	/46/
Tamooch, F.et al. 2008. Below-ground root yield and distribution in natural . Forest Ecology	/47/
Patil V., Singh A., Naik N., Seema U. and Sawant B. 2012. CARBON SEQUESTRATION IN MANGROVES ECOSYSTEMS. Journal of Environmental Research And Development Vol. 7 No. 1A, July-September 2012	/48/
Samantha Sifleet, Linwood Pendleton, and Brian C. Murray. 2011. State of the Science on Coastal Blue Carbon: A Summary for Policy Makers. http://nicholasinstitute.duke.edu/economics/naturalresources/state-of-science-coastal-blue-carbon#.U5cP0HIZptM	/49/
GOFC-GOLD, 2012, <i>A sourcebook of methods and procedures for monitoring and reporting anthropogenic greenhouse gas emissions and removals caused by deforestation, gains and losses of carbon stocks in forests remaining forests, and forestation</i> . GOFC-GOLD Report COP18 version 1, (GOFC-GOLD project office, Natural Resources Canada, Alberta Canada).	/50/
Breithaupt, J.L., Smoak, J.M., Smith, T.J., Sanders, C.J. and Hoare, A. 2012. Organic carbon burial rates in mangrove sediments: Strengthening the global budget. GLOBAL BIOGEOCHEMICAL	/51/

CYCLES, VOL. 26, GB3011, doi:10.1029/2012GB004375	
Chmura, G.L., Anisfeld, S. C., Cahoon, D.R, and Lynch, J.C.2003. Global carbon sequestration in tidal, saline wetland soils. Global Biogeochemical Cycles	/52/
Jennerjahn, T.C. and Ittekkot, V. 2002. Relevance of mangroves for the production and deposition of organic matter along tropical continental margins. Naturwissenschaften (2002) 89:23–30 DOI 10.1007/s00114-001-0283-x	/53/
Hai Ren, Hua Chen, Zhi'an Li and Weidong Han. 2010. Biomass accumulation and carbon storage of four different aged Sonneratia apetala plantations in Southern China. Plant Soil (2010) 327:279–291 DOI 10.1007/s11104-009-0053-7	/54/
Bouillon, S., et al. (2008), Mangrove production and carbon sinks: A revision of global budget estimates, Global Biogeochem. Cycles, 22, GB2013, doi:10.1029/2007GB003052.	/55/
Murray, B.C., L. Pendleton, et al. 2011. Green payments for blue carbon: Economic incentives for protecting threatened coastal habitats. Durham, NC: Nicholas Institute for Environmental Policy Solutions, Duke University.	/56/
Danda, Anamitra Anurag, Gayathri Sriskanthan, Asish Ghosh, Jayanta Bandyopadhyay and Sugata Hazra (2011). Indian Sundarbans Delta: A Vision (New Delhi, World Wide Fund for Nature-India)	/57/
Hazra S, 2010. Temporal change detection (2001-2008) of the Sundarban. Unpublished report. WWF-India, Kolkata (cited in India Sundarbans Delta: A Vision.)	/58/
The World Bank. Building Resilience for Sustainable Development of the Sundarbans through Estuary Management, Poverty Reduction, and Biodiversity Conservation: A Non-Lending Technical Assistance. Draft Final Report and Appendix N. Institutional Approaches for Addressing Priority Challenges in the Sundarbans. 2011	/59/
R. Ray, D. Ganguly, C. Chowdhury, M. Dey, S. Das, M.K. Dutta, S.K. Mandal, N. Majumder, T.K. De, S.K. Mukhopadhyay, T.K. Jana, Carbon sequestration and annual increase of carbon stock in a mangrove forest, Atmospheric Environment, Volume 45, Issue 28, September 2011, Pages 5016-5024, ISSN 1352-2310, 10.1016/j.atmosenv.2011.04.074. (http://www.sciencedirect.com/science/article/pii/S1352231011004638)	/60/
Mitra, A.; Banerjee, K. and Sett, Saurov. 2012. Spatial Variation in Organic Carbon Density of Mangrove Soil in Indian Sundarbans. Natl. Acad. Sci. Lett. (May–June 2012) 35(3):147–154 DOI 10.1007/s40009-012-0046-6	/61/
Mitra,A.; Zaman,S (2014). Carbon sequestration by coastal Floral Community. Teri - Hardcopy	/62/
Ross MS, Ruiz PL, Telesnicki GJ, Meeder JF. Estimating aboveground biomass and production in mangrove communities of Biscayne National Park, Florida (USA). Wetlands Ecol Manage 2001;9(1):27e37.	/63/
Government of West Bengal. 2012. West Bengal State Action Plan on Climate Change	/64/
The World Bank. 2014. Building Resilience for Sustainable Development of the Sundarbans – Strategy Report.	/65/
The World Bank. Integrated Coastal Zone Management (ICZM). http://www.iczmpwb.org/main/pdf/physical_progress/status%20report%20forest.pdf	/66/
Pradeep Vyas, K. Sengupta. Mangrove conservation and restoration in the Indian Sundarbans	/67/

2.3 Interviews

Interviews constituted an important component of the audit process. Interviews were conducted in two phases: an opening and scoping meeting held in Paris in 12 February 2015; and a set of interviews conducted during the site visit from 9 March 2015 to 13 March 2015. The audit team conducted various interviews with the project proponent's staff, staff of other project entities involved in the project, and other stakeholders such as the Director of Sunderband's Biosphere Reserve (Department of Forests), three presidents of Panchayats and three different communities. The list of interviewed persons is detailed as follows:

Name and Role	Affiliation	Date interviewed
Three Pradhans or presidents of Panchayats (local government)	Panchayats	6 June 2014
Mr Arabinda Manna (President)	Land & Forest Protection Committee, Basanti block	6 June 2014
Dr Pradeep Vyas (Director, Sundarban Biosphere Reserve)	Department of Forests	13 March 2015
Dibyajyoti Chatterjee (Project Coordinator)	NEWS	9 March 2015 to 13 March 2015
Ajanta Jay (Joint Secretary and Project Director)	NEWS	12 February 2015; 9 March 2015 to 13 March 2015
Jean-Pierre Renaud (General Delegate, Livelihoods Venture)	Livelihoods Fund	12 February 2015
Stéphane Perrier (Project Manager, Livelihoods Venture)	Livelihoods Fund	12 February 2015
Matthias Seebauer (Consultant)	UNIQUE Forest and Land Use	12 February 2015; 9 March 2015 to 13 March 2015
> 40 members of local communities participating in the project	-	9 March 2015 to 13 March 2015

2.4 Site Inspections

The objectives of the on-site inspections performed were to:

- Ensure that the geographic area of the project, as reported in the project description and the accompanying KML file, is in conformance with Section 3.11.1 of the VCS Standard;
- Select samples of data from on-the-ground measurements for validation in order to meet a reasonable level of assurance and to meet the materiality requirements of the project, as required by Section 5.1.3 of the VCS Standard;

- Perform a risk-based review of the project area to ensure that the project is in conformance the eligibility requirements of the VCS rules and the applicability conditions of the methodology; and
- Perform a risk-based review of the project area to ensure that the project conforms to all other requirements of the VCS rules and the methodology.

In fulfilment of the above objectives, the audit team performed an on-site inspection of the project area on the dates 9 March 2015 to 13 March 2015. The main activities undertaken by the audit team were as follows:

- Interviewed project personnel (see Section 2.3 of this report) to gather information regarding the design of the project;
- Interviewed project personnel (see Section 2.3 of this report) for the purpose of seeking evidence of conformance with respect to the specific requirements of the methodology and the VCS rules;
- Interviewed representatives of the Land & Forest Protection Committee, representatives of the Department of Forests, various Presidents of the Panchayats, and various community members;
- An assessment of the implementation and operation of the proposed project activity through visual inspection;
- Confirmation of the applicability of the methodology through visual inspection and interviews;
- Assessment of the project boundaries and the stand information using a Pocket PC with the geographic information uploaded and connected to a GPS receiver. Six randomly located sample plots were visited and more than 40 planting parcels were checked while accessing to the random points.
- Assessment of the monitoring controls ;

2.5 Resolution of Findings

Any potential or actual material discrepancies identified during the assessment process were resolved through the issuance of findings. The types of findings issued by SCS were characterized as follows:

Non-Conformity Report (NCR): An NCR signified a material discrepancy with respect to a specific requirement. This type of finding could only be closed upon receipt by SCS of evidence indicating that the identified discrepancy had been corrected. Resolution of all open NCRs was a prerequisite for issuance of a validation statement.

New Information Request (NIR): An NIR signified a need for supplementary information in order to determine whether a material discrepancy existed with respect to a specific requirement. Receipt of an NIR did not necessarily indicate that the project was not in compliance with a specific requirement. However, resolution of all open NIRs was a prerequisite for issuance of a validation statement.

Opportunity for Improvement (OFI): Receiving an OFI indicates an area that should be monitored or ideally, improved upon. OFI's are often an indication of something that may become a non-conformity if not given proper attention. A root cause analysis and corrective action plan are not required, but highly recommended. OFI's are considered by the audit team to be closed upon issuance, and a response to this type of finding is not necessary.

A total of ten NCRs and two NIRs were opened as part of the validation. All findings issued by the audit team during the validation process have been closed. In accordance with Section 5.3.6 of the VCS

Standard, all findings issued during the validation process, and the impetus for their closure, are described in Appendix A of this report.

2.6 Forward Action Requests

No Forward Action Requests were identified.

3 VALIDATION FINDINGS

3.1 Project Details

The audit team checked the PD against provided and gathered evidence and confirmed that the description in the project description is accurate, complete, and provides an understanding of the nature of the project. The assessment of each section of the PD's project details is provided below.

3.1.1 *Project type, technologies and measures implemented, and eligibility of the project*

The proposed project activity consists in the restoration of more than 4,600 ha of mangrove habitat (first project activity instance: 4,403 ha), that was degraded and deforested as a result of direct human intervention (i.e. firewood and timber harvesting, prawn seed collection) and as a result of changes in the area's hydrology (i.e. mudflats of recent creation).

The restoration consists in the establishment of *Avicennia* spp., *Bruguiera* spp., *Ceriops* spp., *Excoecaria* spp. and *Sonneratia* spp. seedlings in areas where natural regeneration would not have otherwise been established. The audit team was able to confirm during the site visit that the information and considerations reported in the PD are complete and accurate.

The PD clearly states the Sectoral scope and project type. These are:

- Sectoral Scope: AFOLU, 14
- Category type: Afforestation Reforestation Revegetation (ARR) subject to Wetland Restoration and Conservation (WCR) requirements as set out in Section 3.1.11 of the AFOLU Requirements.
- The project is a grouped project.

Hence, the project is eligible and it has been classified in accordance with the VCS requirements.

A description of the assessment on compliance with the requirements on land eligibility specified in Section 3.1.6 and 3.1.7 of the AFOLU Requirements is provided in Section 3.1.7 of this validation report.

3.1.2 *Project proponent and other entities involved in the project*

According to the PD /1/ the project proponent is:

- Livelihoods Fund: Responsible for the project finance and owner of the carbon credits

Other entities involved in the project have been identified:

- Nature Environment and Wildlife Society (NEWS): Implementing partner for the first instance;
- UNIQUE forestry and land use GmbH.: Carbon consultant;

The audit team confirmed that the PD includes full contact details of these entities, and that the description provided is in accordance with VCS requirements.

3.1.3 *Project start date*

The project start date is 28 September 2010, which is the date in which the first planting of the first project instance commenced. This was effectively confirmed by the audit team during the audit through interviews and through the earliest receipt available on payment for plantation and seed collection /5/.

This is consistent with the plan provided in the agreement between Danone (later replaced by Livelihoods Fund) and NEWS that indicates planting to commence in September 2010 /3/.

Since this start date is after 8 March 2008, according to Section 3.7.3 of the VCS Standard the project must complete validation within five years of the project start date. At the time of this report, the project is expected to conclude validation before 28 September 2015.

Hence, the audit team is able to confirm that the project start date is in accordance with VCS requirements.

3.1.4 Project crediting Period

The project crediting period start date is equal to the start date of the project activity, i.e., the date on which activities that lead to the generation of GHG emission reductions or removals are implemented. The chosen crediting period is of 20 years renewable which is in accordance with the VCS Standard Version 3.5 which sets a minimum of 20 years up to a maximum 100 years for AFOLU projects.

The audit team was able to confirm that the project proponent has in place a robust operating plan in order to manage the project for the whole crediting period. This is confirmed by the agreements in place between NEWS and Livelihoods Fund which clearly establish the roles and responsibilities and the project operation for the whole crediting period /3/. The audit team confirmed during the site visit that this operating plan is in place.

3.1.5 Project scale and estimated GHG emission reductions or removals

The project's first instance is classified as per Section 3.9.1 of VCS Standard Version 3.5 as a 'project' as the estimated annual GHG emission removals amount to 1,024,976 tCO₂e in the crediting period, which are less than 300,000 tCO₂e per year.

3.1.6 Project location

The geographical scope of the proposed grouped project corresponds to the main coastal wetlands in Sundarbans that are not part of the Biosphere reserve. The project area is located in West Bengal district, India, in the South of Dampier Hodges line, between the following coordinates: latitude: 21° 30' - 22°45' N; longitude: 88°00'-89°05' E.

The first instance occurs within the area of the grouped project. The project proponent has provided a KML file with the geographical boundary of the grouped project and of the first instance /7/. The audit team was able to confirm that the grouped project boundary described in the PD is consistent with the KML file and further confirmed the accuracy of the boundaries of the first instance. The latter was confirmed by overlaying the boundaries over Very High Resolution (VHR) imagery and by checking with ground reference data through a GPS receiver. The audit team confirmed that the PD provides a complete project location description which is in compliance with paragraph 3.4.1 of AFOLU requirements: VCS Version 3.4.

The project proponent has demonstrated control over the entire project area of the first instance as required by Section 3.4.2 of the AFOLU requirements: VCS Version 3.4. The assessment of compliance can be found in Section 3.1.9 of this validation report.

Moreover, the audit team confirmed that the first instance area is in compliance with the requirements set in Section 3.4.3 of the AFOLU Requirements, as required to be discussed by Section 3.1.11 of the AFOLU Requirements. According to the revised PD the applicable option of the project would be the one described in Section 3.4.3 3) of the AFOLU Requirements: "Where projects are hydrologically connected to adjacent areas that may have a negative impact on the hydrology within the project area, projects shall demonstrate that such impacts will not result in a significant increase in GHG emissions". The lack of impacts in the SOC pools have been demonstrated and assessed as follows:

- a) The project is a tidal wetland restoration or coastal wetland so the only potential impact could be linked to the reduction in flow in the Metla and Ganges rivers. These rivers have a very high flow and it is not expected that their flows will be significantly affected unless a large derivation or dam is implemented upwaters. However, this is not expected to occur as confirmed by the staff of the forest department, who confirmed that new laws have been established in order to ensure that coastal wetlands are protected and this includes protection against large projects
- b) The project has in place as part of its management plan, monitoring instructions to ensure that the project areas are monitored and in the case of any issues that could cause mortality on the plantations, the project would implement a set of mitigation actions which are budgeted in the plan /3/. Therefore, any negative impact would be identified and addressed.
- c) As confirmed during the site visit through interviews and through literature review, no deforestation or degradation has been caused by these changes in water flow. Wetlands have disappeared due to erosion but this is not related to the impact referred to in the requirement.
- d) Moreover, as confirmed by the audit team, the project area is divided in more than 464 polygons that are dispersed in different areas that belong to different hydrological systems. This would mean that carbon stocks are not concentrated in one unique system, so in the case of any change in the upstream and sea impacts it would be highly unlikely that these affects the whole project area or a significant part of the area.

In view of this, the audit team deems that although the project is hydrologically connected to adjacent areas that may have negative impact on the hydrology of the project area, these potential impacts will not result in a significant increase in GHG emissions.

3.1.7 Conditions prior to project initiation

The audit team confirmed that the information provided in the PD is accurate and complete. Justification regarding the compliance of the project activity with Section 3.1.6 of the VCS AFOLU Requirements and Section 3.1.7 of the VCS AFOLU Requirements is provided in Section 2.2 of the PD and is discussed in Section 3.2.2 of this report.

3.1.8 Compliance with applicable laws, statutes and other regulatory frameworks

The applicable legislation is the following:

- The Indian Forest Act, 1927
- National Forest Policy, 1988
- The West Bengal Protected Forests Rules
- The Forest (Conservation) Act, 1980 with 1988 Amendments FCA-'80
- The Biological Diversity Act, 2002 (Act No. 18 of 2003) Other Acts
- The Wildlife (Protection) Act 1972 and its Amendments with WL(P) Act Schedule

- The West Bengal Trees (Protection and Conservation in non-forest areas) Act, 2006

The audit team held interviews with the representative of the Department of Forests, and with various Presidents of Panchayats and confirmed that the project is in compliance with any applicable laws, statutes and regulatory frameworks.

Hence, the audit team is able to confirm that the project is in compliance with any applicable regulation.

3.1.9 *Ownership and other programs*

- *Right of use*

According to the first version of the PD, the instance is located in lands classified as State Lands. Although the lands belong to the state, the right to assign land-use is transferred to local Panchayats who are responsible for permitting any projects within their jurisdiction. This was effectively confirmed during the interviews held with the Department of Forests, the Panchayat presidents and the President of the Land & Forest Protection Committee (Basanti block). The right of use has been justified at different levels as follows:

- State level: As explained the ownership of the lands where the first instance takes place is held by the State of India, yet any authorization for change in land use has to be given by the Panchayats. With regard to carbon credits, legislation does not state explicitly who owns the right. In order to ensure that the State cannot claim it the project proponent requested a Letter of Approval from the Indian Designated National Authority, who issued one on 22 November 2012 /6/. Under the UNFCCC, the letter of approval means that the project proponent is vested of right of use of the removals generated by the project including the first instance.
- Local Panchayats: The project proponent has signed an agreement with all local Panchayats where the project activity is located, whereby the activity is authorised and the project proponent is vested with the right of use of the removals generated by the first instance /3/. The audit team held interviews with three Panchayat Pradhan's (presidents) and confirmed the authenticity of these documents. These agreements were signed by Livelihoods as confirmed by the audit team. Since Danone was involved at the beginning as financing entity, any right on the first instance was transferred to Livelihoods Fund through various agreements /3/.
- Implementing partner: The project proponent and the implementing partner NEWS have in place an agreement /3/ whereby NEWS vests the project proponent of any right of use that could be applicable. Although NEWS does not have any right of use on the first instance, since it is planting and implementing it may claim rights linked to its role in the project's implementation; this agreement ensures that no double-claim could occur.

In view of this, the audit team is able to confirm that the project proponent has the right of use as it has in place an enforceable and irrevocable agreement with the holder of the statutory, property or contractual right in the land, vegetation or conservational or management process that generates GHG emission reductions or removals which vests the right of use in the project proponent as required by the VCS Standard Version 3.5.

- *Emissions trading programs and other binding limits*

The proposed project activity is an ARR project activity, and it is located in a non-Annex I country under the UNFCCC and a non-Annex A country under the Kyoto Protocol. Therefore, the GHG removals generated would not be part of an emission trading Program, nor is the project located in a jurisdiction or sector with binding limits.

- **Participation under other GHG programs**

The first instance of the grouped project was proposed as a CDM project and was submitted to the UNFCCC, but was never registered as the registration fees were never paid /40/. This project will never be registered as communicated by the project proponent; its initial intention was to conduct a gap validation in order to generate VCUs, but it realized that the CDM registration fees did not justify this option and that the grouped project allowed for an expansion of boundaries that was not allowed under the CDM.

Therefore, the project does not participate under other GHG programs.

- **Other forms of environmental credit sought or received**

The proposed project activity does not generate another form of environmental credit.

- **Rejection by other GHG programs**

The proposed project activity has not been rejected by any other GHG program as confirmed by the audit team by checking the CDM database /40/ and the Gold Standard database /42/.

3.1.10 Additional information relevant to the project

- **Eligibility criteria for grouped projects**

In line with Section 3.4.9 of the AFOLU requirements: VCS Version 3.4 “grouped projects shall include one or more sets of eligibility criteria for the inclusion of new project activity instances”. As such the project proponent has defined a series of eligibility criteria for the inclusion of new project activity instances.

The eligibility criteria defined for the inclusion of instances have been validated by the audit team:

Eligibility criteria of Grouped Project	Rationale
1. All the new instances will accomplish the applicability conditions of the methodology AR-ACM0014: Afforestation and reforestation of degraded mangrove habitats, version 03.0. a. The land subject to the project activity is degraded mangrove habitat. The planting areas of this A/R project activity are emerged mudflats which were created by the local system dynamics and are locally called “char”, which are basically located along embankments. Overall, there has been a decline in mangrove forests in the Indian Sundarbans as result of population pressure, and unsustainable use of the mangroves. All new instances will be within the outer boundary of this grouped project which is subject to the definition of the degraded mangrove habitats in the Sundarbans. b. More than 90 per cent of the project area is planted	This Eligibility Criterion (EC) serves to ensure that the project meets the applicability conditions set out in the methodology applied to the project as required by Section 3.4.9 1) of the VCS Standard Version 3.5.

Eligibility criteria of Grouped Project	Rationale
with mangrove species. If more than 10 per cent of the project area is planted with non-mangrove species then the project activity does not lead to alteration of hydrology of the project area and hydrology of connected up-gradient and down-gradient wetland area. Only mangrove species were selected and will be selected for all future project instances. c. Soil disturbance attributable to the A/R clean development mechanism (CDM) project activity does not cover more than 10 per cent of area. As for the first instances, the plantation techniques for all future instances in this project will not involve soil disturbance, mangrove seedlings are planted by direct planting of seeds or planting of nursery-raised seedlings.	
2. Use technologies or measures similar to the specified in this project description for the first instance and apply them in the same manner. New instances will consist of wetlands restoration through planting and/or assisting natural regeneration using native species and involving local communities;	This EC serves to ensure that the instance applies the same technologies in the same way as described in the PD. This will serve to meet the requirements set in Section 3.4.9 2) and 3) of the VCS Standard Version 3.5.
3. Be subject to the baseline scenario of this Project Description for the specified project activity and geographic area, and therefore be established on lands where baseline scenario is degraded wetlands. The whole geographic project area within which the project instances shall be located is subject to the baseline scenario determined in this project description. All project instances as well future instances are classified as mudflats - shoals that are simply salt marches with no or some existing shrubby biomass vegetation with patches of degraded mangrove trees. Due to the high population densities, and the high dependency on fishing and prawn seed collection (as much as 50% of the local population) within the creeks and channels of the inhabited areas the pressures on the "free" natural resource base are exacerbated.;	This EC serves to ensure that the instance applies the same baseline scenario as the one described in the PD. This will serve to meet the requirements set in Section 3.4.9 4) of the VCS Standard Version 3.5 and Section 3.4.9 5) of the VCS Standard Version 3.5.
4. The new instances will be placed inside the outer boundary described above;	This EC serves to ensure that the instance occurs within the geographical region of the grouped project as required by the VCS Standard Version 3.5.

Eligibility criteria of Grouped Project	Rationale
5. Have characteristics with respect to additionality that are consistent with that of the first instances, facing similar barriers. The baseline scenario and the demonstration of additionality are determined for the entirety of the geographic project area within which project activity instances are developed. All new areas shall present similar barriers than the first instance project, namely investment barriers, other than economic/financial barriers; technological barriers; and barriers due to social conditions. As the whole project occurs within the buffer zone of the biosphere area of the Indian Sundarbans, all legal characteristics and protections of the areas are equal. The first project instances have been selected to be representative for the entire project region.	This EC serves to ensure that the instance applies the same baseline scenario as the one described in the PD. This will serve to meet the requirements set in Section 3.4.9 4) of the VCS Standard Version 3.5 and Section 3.4.9 5) of the VCS Standard Version 3.5.
6. Have the project boundary consistent with the physical/geographical boundary of the grouped project. All new instances will be developed and implemented within the geographic delineation of the NEWS outer project boundary. Be included in the monitoring report with sufficient technical, financial, geographic and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body. In future monitoring reports accuracy information about the technologies or measures applied as well as the geographic information of the new project areas will be included. All polygons will be geo-referenced and compiled in a GIS based database system.	This EC serves to ensure that the instance occurs within the geographical region of the grouped project as required by the VCS Standard Version 3.5. This EC serves to ensure that new instances will provide enough information in order to allow their validation as required by the VCS Standard Version 3.5.
7. Have documentary evidence of the starting date;	This EC serves to ensure that new instances will provide enough information in order to allow their validation as required by the VCS Standard Version 3.5.
8. Be included in the monitoring report with sufficient technical, financial, geographic and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body.	This EC serves to ensure that new instances will provide enough information in order to allow their validation as required by the VCS Standard Version 3.5.

The audit team was able to confirm that the first instance complies with the eligibility criteria as assessed in this validation report.

- **Leakage management for AFOLU projects**

This would be not applicable to the project as there are no leakage emission sources as described in Section 3.2.6.3 of this validation report.

- **Commercially sensitive information**

Not applicable to the project.

3.2 Application of Methodology

3.2.1 Title and Reference

The proposed project activity applies the CDM methodology CDM AR-AM0014 Version 3.0 "Afforestation and reforestation of degraded mangrove habitats". The project proponent applies version 3.0 which is the latest available in the UNFCCC site. Additionally the project applies the following tools:

- 'Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities' (version 01.0.0);
- 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (version 4.1.0);
- 'Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities' (version 3.0.0);
- 'Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity' (version 2.0.0);
- 'Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0);
- 'Calculation of the number of sample plots for measurements within A/R CDM project Activities' (version 2.1).

3.2.2 Applicability

The applied baseline methodology is justified as it has been demonstrated that the first instance ensures that:

Applicability conditions of CDM AR-AM0014 Version 3.0	Rationale
a) The land subject to the project activity is degraded mangrove habitat;	The land subject to the first instance is degraded mangrove habitat. This was effectively confirmed through interviews and through different pieces of third party evidence /59/ which show that the mangrove ecosystem where the project is established has suffered a decrease in forest cover caused by a number of different reasons such as population pressures and natural regeneration failure. As confirmed by the audit team the planting areas once contained mangrove forests but are now deforested due to human pressure (degradation) or past erosion.

Applicability conditions of CDM AR-AM0014 Version 3.0	Rationale
b) More than 90 per cent of the project area is planted with mangrove species. If more than 10 per cent of the project area is planted with non-mangrove species then the project activity does not lead to alteration of hydrology of the project area and hydrology of connected up-gradient and down-gradient wetland area;	As confirmed during the site visit, the planted genus are <i>Avicennia</i> spp., <i>Bruguiera</i> spp., <i>Ceriops</i> spp., <i>Excoecaria</i> spp. and <i>Sonneratia</i> spp. which are mangrove species. Hence, the audit team is able to confirm that the project's first instance is in compliance with this applicability condition.
c) Soil disturbance attributable to the A/R clean development mechanism (CDM) project activity does not cover more than 10 per cent of area"	As confirmed during the site visit, mangrove propagules are planted directly in the soil without any preparation. Moreover, no flooding, digging, drainage, ditch blocking or any other direct activity involving the alteration of the hydrology is implemented as confirmed during the site visit and through the planting areas audit report /16/ and other pieces of evidence /10/.
d) A project activity applying this methodology shall also comply with the applicability conditions of the tools contained within the methodology and applied by the project activity.	The only tools with applicability conditions were assessed as follows: • <u>Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities</u>. The tool has two applicability conditions with which the project complies with: • Forestation of the land within the proposed project boundary performed with or without being registered as the A/R CDM project activity shall not lead to violation of any applicable law even if the law is not enforced: This was confirmed in Section 3.1.8 of this report. • This tool is not applicable to small - scale afforestation and reforestation project activities: As confirmed in Section 3.1.5 of this validation report, the project will generate 1,024,976 tCO₂e in 10 years, which means more than 16 ktCO₂e per year which is the maximum threshold for a small scale project. • <u>Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity</u>. This tool is only applicable for ex-post estimation as no burning takes place as part of site preparation. • <u>Estimation of the increase in GHG emissions attributable to displacement of pre-project</u>

Applicability conditions of CDM AR-AM0014 Version 3.0	Rationale
	<u>agricultural activities in A/R CDM project activity</u> . This tool is not applicable if the displacement of agricultural activities is expected to cause, directly or indirectly, any drainage of wetlands or peat lands. As assessed in Section 3.2.6.3 of this report, no displacement of activities exist so this is not applicable.

The audit team also confirmed that the project is in compliance with the applicability conditions of the relevant tools.

Moreover, the audit team also confirmed that Section 2.2 of the PD provides a discussion on land eligibility for the first instance. As described in the PD and as validated by the audit team, an eligibility study was conducted by the carbon consultant which consisted in using mangrove forest cover maps produced by Giri et al. (2011) for 2010, further refined with VHR imagery from Google Earth. The audit team checked the project polygons systematically against 2010 VHR imagery and confirmed that the project area is eligible and that any area that was forested at the time of the start date and in the previous 10 years has been excluded. Therefore, it was confirmed that the project area is eligible as it was not cleared of native ecosystems in the 10 years period prior to the start date of the project activity as required by Section 3.1.6 of the VCS AFOLU Requirements.

Moreover, the audit team confirmed that Section 2.2 of the PD discusses that the area of the first project instance was not drained for implementing the project. As described in the PD and as validated by the audit team, the lands where the instance has been implemented are in a degraded Mangrove ecosystem due to direct human degradation (i.e., harvesting for firewood and timber) and other natural causes, but no drainage has occurred. Hence, the project area is in compliance with the requirements set in Section 3.1.7 of the VCS AFOLU Requirements.

3.2.3 Project Boundary

The project boundary has been defined as those areas that are eligible under VCS Standard Version 3.5.

- Project boundary and land eligibility

The project boundary of the first instance constitutes the limits that geographically delineate the proposed project activity under the control of the project participants. The first project instance constitutes the aggregate of all areas planted in the period 2010-2014 with Mangrove species as part of the Livelihoods Fund project implemented by NEWS. As confirmed by the audit team through the actual ESRI Shapefiles /7/, this first instance represents 4,404 ha which represents the gross area planted. All of the project boundary complies with the land eligibility criteria as assessed in Section 3.1.7 of this validation report.

The project proponent has demonstrated that it has control over the entire project area of the first instance at the time of validation as required by Section 3.4.2 of the AFOLU Requirements. This has been assessed in Section 3.1.9 of this validation report.

- Carbon pools

Regarding the selection of carbon pools, CDM *AR-AM0014* (Version 3.0) requires accounting of aboveground and belowground carbon pools, does not allow for the accounting of the litter carbon pool while the remaining carbon pools are optional. The audit team confirmed that the PD includes provisions to include the four carbon pools indicated in the table below, hence the audit team is able to confirm that the carbon pools to be considered in the proposed A/R project activity were selected in accordance with the requirements of the selected methodology CDM *AR-AM0014* (Version 3.0).

Project carbon pool	Accounted for	Rationale
Above-ground biomass	Yes	Required according to the applicable methodology. The audit team confirmed that the PD includes provisions in order to account for this carbon pool.
Below-ground biomass	Yes	Required according to the applicable methodology. The audit team confirmed that the PD includes provisions in order to account for this carbon pool.
Dead wood	Yes	This carbon pool is optional according to the methodology. The project participant is accounting for it.
Litter	No	This carbon pool is not eligible according to the methodology.
Soil organic carbon (SOC)	Yes	This carbon pool is optional according to the methodology. The project participant is accounting for it.

- Selection of Sources and Sinks

The identified boundary and selected sources and gases are justified for the project activity and are in line with the applicable methodology CDM *AR-AM0014* (Version 3.0). The inclusion and exclusion of emission sources are explained below:

Source / Sink		GHGs	Description
Baseline removals	Carbon stock changes by trees actually present in the planned project area in the baseline;	CO_2	Excluded as assessed in Section 3.2.6.1 of this validation report.
Project emissions	Changes in carbon stocks	CO_2	The audit team confirmed that source was correctly included as required by the applicable methodology.
	Biomass Burning	CO_2	The audit team confirmed that this source is already included in the changes of carbon stocks according to the applicable methodology.

Source / Sink		GHGs	Description
		CH ₄	Included emissions from forest fires as required by the tool for the 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (version 4.1.0) and excluded emissions from site preparation and forest management activities. As the audit team was able to confirm during the site visit through visual inspection and through interviews no burning of residues occur within the project boundary as part of the site preparation and forest management operations.
		N ₂ O	
Leakage emissions	Displacement of existing activities	CO ₂	As explained in section 3.2.6.3 of this validation report, leakage emissions are not applicable.

The validation of the project activity did not reveal other greenhouse gas emissions or removals occurring within the proposed project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 5% of total decreases in carbon pools and increases in emissions, or more than 5% of net anthropogenic removals by sinks, which are not addressed by CDM AR-AM0014 Version 3.0.

3.2.4 Baseline Scenario

Following the provisions of CDM AR-AM0014, the project proponent has identified the baseline scenario through the application of the 'Combined tool to identify the baseline scenario and demonstrate additionality in AR CDM project activities' (version 1).

Step 0: Preliminary screening based on the starting date of the A/R project activity:

Following the provisions of the 'Combined tool to identify the baseline scenario and demonstrate additionality in AR CDM project activities' (version 1), as the proposed project activity has a starting date after 31 December 1999 but before the date of registration, the project participant has to show that:

- The starting date of the proposed project activity was after 31 December 1999.
- The incentive from the planned sale of CERs was seriously considered in the decision to proceed with the project activity.

Although these are CDM requirements that are not consistent with the VCS requirements, the audit team has validated the project's compliance. Regarding the first condition, as assessed in Section 3.1.3 of this validation report, the starting date is 31 July 2009 which is after 31 December 1999. Regarding the second condition, the audit team was able to confirm compliance through a MOU signed between the project proponent, indicating that they are seeking carbon finance, dated 9 June 2010 /3/, i.e., before the start date of the project.

Step 1. Identification of alternative land use scenarios to the proposed ARR VCS project activity

Following the provisions of the 'Combined tool to identify the baseline scenario and demonstrate additionality in AR CDM project activities' (version 1) the project proponent has identified plausible alternative land-use scenarios:

Alternative land use scenario	Rationale
1. Continuation of the pre-project land use	The continuation of the pre-project land use is the continuation of degradation of the Mangrove area. The audit team confirmed that this is a realistic scenario as it consists in the continuation of the pre-project scenario. This is a plausible scenario that is in compliance with the local legislation which does not require to restoration of degraded lands. The plausibility of this scenario was confirmed by the land eligibility study provided in the PD which shows that these lands have been degraded and will probably continue to be degraded. The legality of this scenario was confirmed through interview with the representative of the Department of Forests who confirmed that there is no legislation in India or in Bengal that requires restoration of the vegetation in these areas. Recent legislation prohibits the deforestation of Mangroves, but this is not applicable to already degraded or deforested sites.
2. Natural mangrove regeneration of the land within the project boundary	The natural regeneration of mangrove within the project area would be another alternative. The audit team confirmed that this is a realistic scenario as in some areas of the project area there is some existing mangrove and some of the project areas have good (natural) conditions for natural regeneration. This is a plausible scenario that is in compliance with the local legislation which does not prohibit or require that degraded mangrove areas are left to regenerated naturally. The plausibility of this scenario was confirmed by the land eligibility study provided in the PD which shows that these lands have been degraded and will probably continue to be degraded. The legality of this scenario was confirmed through interview with the representative of the Department of Forests who confirmed that there is no legislation in India or in Bengal that requires restoration of the vegetation in these areas.
3. Mangrove afforestation of the land within the project boundary performed without being registered as Livelihoods VCS grouped project activity	The implementation of the project activity without carbon finance is a plausible scenario as confirmed by the fact that the project is implemented. Moreover, the project is in compliance with all local legislation as assessed in Section 3.1.8 of this validation report. Furthermore, the audit team confirmed that this scenario is not mandated by any law, statute or other regulatory framework, as confirmed through interview with the representative of the Department of Forests.

The audit team confirms that there is not any other realistic plausible alternative land use scenario as confirmed through visual inspection during the site visit (i.e. no other land uses are present in mangrove

areas that are the object of the restoration), interviews, checking Very High Resolution (VHR) satellite imagery and other documentary evidence /58/.

STEP 2. Barrier analysis

Following the provisions of the 'Combined tool to identify the baseline scenario and demonstrate additionality in AR CDM project activities' (version 1) the project participant has identified a number of barriers that may affect the identified alternative scenarios:

- Investment barrier;
- Institutional barrier;
- Technological barrier;
- Barriers due to Ecological conditions

1. Continuation of the pre-project land use

The Continuation of the pre-project land-use would not face any of the above barriers as:

- It does not require any investment to be sustained;
- No specific organization is required to sustain the existing activities, which are in many cases subsistence driven and are implemented by individuals and not organizations;
- There is no technological barrier involved in the continuation of the pre-project scenario (i.e., sustained degradation);
- Ecological conditions are not a limitation to continue existing activities.

The non-existence of any barrier to the implementation of this activity is confirmed by the fact that this activity is existing and it is widely spread across the area of the grouped project.

2. Natural mangrove regeneration of the land within the project boundary

As described in the PD this activity faces a barrier linked to ecological conditions as degraded forest and mudflats do not have regenerative capacity. Regarding the former, as indicated by Hazra et al. (2010) /58/, during the period 1989-2009 degraded forest has been replaced by saline banks, indicating a degrading scenario across the Sundarbans. The main reason of this degradation is the lack of available propagules due to the loss of forest. Regarding the latter, as confirmed during the site visit, mudflats have been subject to prawn seed collection in the past, an activity that has a negative impact on regeneration and does preclude the natural succession to marsh and then to mangrove. The creation of saline blanks is largely attributed to sporadic inundation of the upper reaches of the island during high tide and storm surges and subsequent drying. In view of this, it may be confirmed that the barrier due to ecological conditions is real. The existence of this barrier is confirmed by the fact that no similar project has been implemented in the past, as assessed below in the Common Practice Analysis of Section 3.2.5.

Carbon benefits would help to overcome this barrier as the project has focused in addressing those factors that are limiting the natural regeneration: a) Transport of propagules to the project area; b) Engagement with local communities in order to stop the prawn-seed collection and other degrading activities. These two activities are provided by the project, which would not have taken place without the engagement of Livelihoods, whose main rationale for participating in the project has been the carbon credits.

Hence, the audit team deems that this alternative faces an ecological conditions barrier which is real.

Scenario 3: Mangrove afforestation of the land within the project boundary performed without being registered as Livelihoods VCS grouped project activity

The proposed project activity faces three different barriers: Investment barrier; an institutional Barrier; and a technological barrier.

- Investment barrier: The PD provides a justification on the existence of an investment barrier, other than lack of financial results. In the past, afforestation activities have been conducted by the government but on a very limited scale as assessed below in the Common Practice Analysis of Section 3.2.5. One of the reasons is the lack of financial resources as confirmed by the representative of the Department of Forests. Private credits for these activities do not exist in the market as confirmed by the Department of Forests.

Carbon benefits would help to overcome this barrier as the main reason for starting the project by Livelihoods are the carbon benefits. Livelihoods, is guaranteeing the investment for the implementation including the first 10 years of project operation.

Hence, the audit team deems that this alternative faces an investment barrier which is real.

- Technological barrier: As described in the PD the proposed project activity is technically complex in nature: it consists in 4,000 ha which are distributed in 464 polygons in a very extended area. Moreover, as part of the logistical challenge there were other challenges involved such as the lack of planting material (i.e., there are no local seed suppliers and the project is planting seven different species) or the selection of the planting zones (i.e., planting was done only in stable areas). All these technical challenges would be impossible to be overcome without the carbon benefits. The existence of this barrier is confirmed by the reduced number of projects in the region and the small size of those projects, as assessed below in the Common Practice Analysis of Section 3.2.5.

Carbon benefits would help to overcome this barrier through the technological support given by Livelihoods Fund to NEWS in order to implement the project. As confirmed by the audit team through interviews, the project has engaged experts from IUCN or throughout the world to provide the necessary expertise to select the planting areas, and Livelihoods Fund has provided support in order to improve the organizational framework of the project (e.g., the financial system of NEWS). Livelihoods Fund has provided its support to the project in exchange for carbon benefits, which would confirm that these were critical to overcome the barrier.

Hence, the audit team deems that this technological barrier is real.

1. Barrier due to social conditions: The PD provides a justification on the existence of a barrier due to social conditions linked to the lack of organization of local communities. Although local communities have their own government institutions and organization, there is an inability for community level organizations to interact meaningfully with state level organizations on issues such as large scale mangrove plantation or mangrove restoration. The existence of this barrier is justified by the fact that some areas that are aimed by the project are old government plantations that were implemented without interacting with the local communities and that resulted in a very high mortality in few years. The confirmation of this barrier was confirmed by the representative of the Department of Forests and it was confirmed during the site visit. The existence of this barrier is confirmed by the fact that no similar project has been implemented in the past, as assessed below in the Common Practice Analysis of Section 3.2.5.

Carbon benefits would help to overcome this barrier as the main reason for starting the project by Livelihoods are the carbon benefits. Livelihoods, through its implementing partner, provides a

new model that is essentially based on using self-help groups (SHGs) to expand into afforestation as a way of overcoming barriers observed in the past. This would enable communities to lead the afforestation activities and have the full accountability for these.

Hence, the audit team deems that this alternative faces a barrier due to social conditions which is real.

As shown above, since the only alternative that would not face any barrier would be the alternative land-use scenario “1. Continuation of the pre-project land use”, and the proposed project activity faces the above barriers, according to the applicable tool conducting Step 3. Investment analysis is not required and the remaining land use is the baseline scenario. Hence, the selected baseline land-use would be that without carbon finance the current land-use of degraded mangrove would continue. The audit team deems that the identified baseline scenario is justified.

All the assumption and data used by the project proponents are listed in the PD and/or supporting documents. All documentation relevant for establishing the baseline land-use is correctly quoted and interpreted in the PD. Assumptions and data used in the identification of the baseline land-use are justified and appropriately supported by evidence and can be deemed reasonable. Relevant national and/or sectoral policies and circumstances are considered and listed in the PD. Moreover, the procedures for identifying the baseline scenario have been correctly followed and the identified scenario reasonably represents what would have occurred in the absence of the project.

3.2.5 Additionality

The additionality of the project is demonstrated following the ‘Combined tool to identify the baseline scenario and demonstrate additionality in AR CDM project activities’ (version 1). As assessed in Section 3.2.4, the baseline scenario has been demonstrated to be the “1. Continuation of the pre-project land use”, which is the scenario that does not face any barrier. Following the applicable tool, step 3. Investment analysis is not required as the project activity faces barriers which the alternative “1. Continuation of the pre-project land use” does not face. However, in order to demonstrate the project’s additionality it shall be demonstrated that it is not a common practice.

STEP 4. Common practice analysis

The geographical area of the common practice are all those areas with a comparable environment as the proposed project activity: Mangrove areas in the Sunderbans of Bangal, i.e., areas covering the Sundarban Biosphere Reserve (4,260 km² protected area comprising the core and buffer zone) as well as the 5,400 km² of transition area including non-forest, inhabited region of the Sunderbans along the north and north-western fringe of mangrove forest. The audit team deems that this geographical region is appropriate as it is subject to the same ecological and socio-economic conditions as the initial instance.

According to the due diligence conducted by a consultant for the project proponent, the total area reforested per year would not exceed 200 ha/year. According to the due diligence, this area would come from the area established by the Department of Forests (150 ha/year) and the area planted as part of the World Bank’s Integrated Coastal Zone Management (ICZM) project (50 ha/year). The audit team confirmed through literature that since 1990 17,000 ha of mangrove were established, however, this occurred within the boundaries of the Sundarban Biosphere reserve /67/, which are restorations not comparable to the project activity as these occur within the boundaries of a protected area that is under control of the Department of Forests and where no human population is present. Moreover, most of the

restored areas suffer from a high mortality /59/, which was confirmed by the audit team during the site visit and by checking fine resolution imagery from 2010 and 2014. The audit team confirmed that as part of the World Bank's Integrated Coastal Zone Management (ICZM) project /66/, only 46 ha are planned in total, indicating a very low rate of around 10 ha/year, well below the rate pointed out by the due diligence. In view of the above the project activity would not be a common practice in the geographical region of analysis and it would, therefore, be additional. The audit team confirms that the assumptions made in the demonstration of additionality are reasonable and that the project's additionality is well documented.

3.2.6 Quantification of GHG Emission Reductions and Removals

The GHG removals have been calculated following the provisions of CDM AR-AM0014 and the applicable tools:

- 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (version 4.1.0);
- 'Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities' (version 3.0.0);
- 'Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0);
- 'Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity' (version 2.0.0).

As assessed below, the audit team is able to confirm that all relevant assumptions and data are listed in the project description, including their references and sources, and that all data and parameter values used in the project description are considered reasonable in the context of the project.

Unless otherwise provided, the validation of the ex-ante values assumed for each parameter is provided in Section 3.2.8.1 and Section 3.2.8.2 of this validation report.

3.2.6.1 Quantification of baseline emissions

According to CDM AR-AM0014 the baseline net GHG removals by sinks consist of the following components and will be determined as:

$$\Delta C_{BSL,t} = \Delta C_{TREE_BSL,t} + \Delta C_{SHRUB_BSL,t} + \Delta C_{DW_BSL,t}$$

Where:

- $\Delta C_{TREE_BSL,t}$; $\Delta C_{SHRUB_BSL,t}$: Change in carbon stock in baseline tree and shrub biomass within the project boundary in year t; t CO₂-e. This is estimated following the tool for 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (version 4.1.0). Following the provisions of the applicable tool, this may be considered zero if the three conditions set in paragraph 11 of the tool are complied with. As confirmed by the audit team during the site visit, the project complies with the three requirements:
 - o The pre-project trees are neither harvested, nor cleared, nor removed throughout the crediting period of the project activity. As confirmed during the site visit most of the planted areas are bare and where existing trees are present these are not removed as there is no slashing of existing vegetation involved;

- o The pre-project trees do not suffer mortality because of competition from trees planted in the project, or damage because of implementation of the project activity, at any time during the crediting period of the project activity. As confirmed during the site visit, the existing species are *Avicennia sp.* and *Rhizophora sp.* which are integral part of the ecosystem. The project intends to restore an existing ecosystem using the same species as the existing ones, so it is not likely that existing vegetation will be killed by newly established vegetation since there will be no dominance of the latter over the former;
- o The pre-project trees are not inventoried along with the project trees in monitoring of carbon stocks but their continued existence, consistent with the baseline scenario, is monitored throughout the crediting period of the project activity. The audit team confirmed during the site visit (through re-measurement of eight sample plots and review of SOPs /12/) that existing trees or vegetation is measured but it is not included in the estimation of GHG benefits. The continuous presence of these trees will be confirmed through continuous measurement.

Therefore $\Delta C_{TREE_BSL,t} = 0$ and $\Delta C_{SHRUB_BSL,t} = 0$.

- $\Delta C_{DW_BSL,t}$: Change in carbon stock in baseline dead wood biomass within the project boundary in year t; t CO₂-e. This is estimated following the tool for 'Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities' (version 3.0.0). The project proponent has selected the conservative default-factor set out in Section 6.2 of the tool, which consists in the multiplication of the changes of carbon stocks in tree biomass by a conservative default value.

Since $\Delta C_{TREE_BSL,t} = 0$, $\Delta C_{DW_BSL,t} = 0$.

Hence, the baseline removals is equal to 0 tCO₂ over the crediting period.

3.2.6.2 Quantification of project emissions

The actual net GHG removals by sinks ($\Delta C_{ACTUAL,t}$) are equal to the project sum of changes in carbon stocks of the above-ground and below-ground tree biomass ($\Delta C_{P,t}$), minus the sum of the increases in GHG emissions by sources within the project boundary as a result of the implementation of the project activity ($GHG_{E,t}$).

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t}$$

- Changes in carbon stocks ($\Delta C_{P,t}$)

Following the provisions of the applicable methodology, the project sum of changes in living biomass carbon stocks (ΔC_P) would be equal to:

$$\Delta C_{P,t} = \Delta C_{TREE_PROJ,t} + \Delta C_{SHRUB_PROJ,t} + \Delta C_{DW_PROJ,t} + \Delta SOC_{PROJ,t}$$

Where:

- $\Delta C_{TREE_PROJ,t}$: Change in carbon stock in tree biomass in project in year t; t CO₂-e. This is estimated following the tool for the 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (version 4.1.0). Considering equation (11) this would be estimated by the difference in carbon stocks in a year by year basis. Considering equations (12), (13), (14), (16), (12), (13), (14) and (15) of the mentioned tool, the yearly carbon stocks in tree biomass within the project boundary in year t, has been estimated through the following equation:

$$C_{TREE_PROJ,t} = \frac{44}{12} \times CF_{TREE} \times A \times \left(\sum_{i=1}^M w_i \times \left(\frac{\sum_l f(x_{1,l}, x_{2,l}, \dots) \times (1 + R_j)}{A_{PLOT,i}} \right) \right)$$

Where:

- CF_{TREE} = Carbon fraction of tree biomass; tC t d.m.⁻¹.
- R_j = Root-shoot ratio for tree species j; dimensionless.
- $f(x_{1,l}, x_{2,l}, \dots)$ = Above-ground biomass of the tree returned by the allometric equation for species j relating the measurements of tree l to the above-ground biomass of the tree; t d.m. In order to apply the allometric equation for ex-ante estimates, the project proponent sourced the average annual growth in DBH and H from Ray et al. (2011) /60/. The allometric equation used for ex-ante estimates was sourced from the same study. Although, the above equations are only used for ex-ante estimates, the audit team is able to confirm that the used models are in compliance with the requirements set in Section 4.1.6 (2)-(6) as required by Section 3.1.4 of the VCS Standard:
2. The allometric model is sourced from a study conducted by qualified researchers /60/;
 3. The publication from where the model has been sourced is a peer-reviewed publication /60/;
 4. As indicated by the publication, all sourced of uncertainties have been assessed following best practices, i.e. standard errors of model parameters have been reported /60/;
 5. The model has been calibrated using data from the Sundarbans /60/;
 6. Conservative factors are not required in this case as the allometric equation provides accurate estimates of tree biomass in the Sundarbans.
- A = Sum of areas of the tree biomass estimation strata; ha.
- w_i = Ratio of the area of stratum i to the sum of areas of tree biomass estimation strata (i.e. $w_i = A_i/A$); dimensionless.
- $A_{PLOT,i}$ = Area of sample p in stratum i, ha.
- $\Delta C_{SHRUB_PROJ,t}$: Change in carbon stock in baseline shrub biomass within the project boundary in year t; t CO₂-e. This is estimated following the tool for the 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (version 4.1.0). This has been assumed to be zero for ex-ante estimates as accepted by paragraph 10 of the applicable tool. Therefore $\Delta C_{SHRUB_PROJ,t} = 0$.
 - $\Delta C_{DW_PROJ,t}$: Change in carbon stock in baseline dead wood biomass within the project boundary in year t; t CO₂-e. This is estimated following the tool for 'Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities' (version 3.0.0). The project proponent has selected the conservative default-factor set out in Section 6.2 of the tool, which consists in the multiplication of the changes of carbon stocks in tree biomass by a conservative default value. Considering equations (8) and (9):

$$C_{DW_PROJ,t} = C_{TREE_PROJ,t} \times DF_{DW}$$

Where:

$C_{TREE_PROJ,t}$ = Carbon stock in trees biomass in stratum i at a point of time in year t, as calculated as explained above; t CO₂e

DF_{DW} = Conservative default factor expressing carbon stock in dead wood as a percentage of carbon stock in tree biomass; per cent.

- $\Delta SOC_{PROJ,t}$: Change in carbon stock in the soil organic carbon (SOC) pool within the project boundary, in year t; t CO₂-e. This is estimated following equation (4) of the applicable methodology:

$$\Delta SOC_{PROJ,t} = \frac{44}{12} \times \sum_{t=1}^t A_{PLANT,t} \times dSOC_t \times 1 \text{ year}$$

Where:

$A_{PLANT,t}$ = Area planted in year t; ha

$dSOC_t$ = The rate of change in SOC stocks within the project boundary, in year t; t C ha⁻¹ yr⁻¹.

- Project emissions (GHG_{E,t}).

No emissions from fires have been considered in the ex-ante calculations as no burning is used to clear the land for planting. As was confirmed by the audit team during the site visit, no burning occurs as part of the site preparation within the project boundary and no burning occurs as part of the forest management. Emissions from forest fires will be monitored as required by the 'Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0).

Therefore, GHG_{E,t}=0.

The audit team checked the calculations and confirmed that the resulting value is 472,416 tCO₂ over the crediting period.

3.2.6.3 Quantification of leakage

According to the applicable methodology leakage has to be estimated based on the tool 'Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity' (version 2.0.0), hence the provisions of this tool have been followed. According to the same tool, only leakage due to displacement of agricultural activities (i.e., crop cultivation activities and grazing activities occurring on land) has to be accounted for. According to the PD, leakage emissions are negligible as there were no agricultural activities within the project area before the project implementation. The audit team confirmed this extent through interviews (i.e., confirmed that no activities as part of prawn-seed collection are present in the non-forested mangrove areas) and visual inspection, and deems that leakage emissions are negligible for the first instance and most likely for the future instances. The audit team found during the site visit that leakage could be potentially come from the displacement of prawn-seed collection, however, during the interview with the staff of the Department of Forests it was confirmed that prawn-seed collection can only occur in areas with no vegetation as otherwise it would not be physically possible to drag the fishing net. The staff further confirmed that this means that this activity would be displaced to a non-forest area as it is the only area where the activity is feasible; they indicated that deforestation of new areas (at large scale) for prawn-seed collection is highly unlikely as

existing forests in the Sundarbans are fully protected by current laws. Therefore, this source of leakage may be assumed to be negligible.

Hence, it can be confirmed that the leakage is negligible, $LK_i = 0$.

3.2.6.4 Summary of GHG emission reductions or removals

The audit team has confirmed that the calculations are in accordance to the methodology CDM AR-AM0014 Version 3.0, and that the GHG emission removal calculations are correct.

Based on the calculations and results presented in the sections above the implementation of the project activity will result in an average ex-ante estimation of net GHG emission reductions (i.e. GHG benefits) of 1,024,976 tCO₂e in total for the crediting period. Considering the risk rating of the proposed project activity (i.e. 15%), the total buffer credits would be equal to 153,746 tCO₂e. This would give a total of 871,230 VCUs issued in the crediting period.

Baseline Emissions and Removals	0 tCO ₂ e
Project Emissions and Removals	1,024,976 tCO ₂ e
Leakage emissions	0 tCO ₂ e
Net GHG benefits	1,024,976 tCO ₂ e
GHG credits issued	1,024,976 tCO ₂ e
Buffer credits -Non-permanence risk rating: 10%	153,746 tCO ₂ e
VCUs in crediting period	871,230 tCO₂e

The audit team confirmed that the project is in compliance with the requirements set in Section 3.7.2 of the AFOLU Requirements, as required to be discussed by Section 3.1.11 of the AFOLU Requirements. According to Section 3.7.2 the maximum quantity of GHG emission reductions that may be claimed by the project is limited to the difference between project and baseline scenario after a 100 year time frame, as set out in Section 4.5.29. According to this Section, the maximum quantity of GHG emission reductions that may be claimed by the project shall not exceed the net GHG benefit generated by the project 100 years after its start date. Since the project activity only generates GHG removals by sinks and no GHG emission reductions (i.e., the project is not claiming GHG Emission Reductions, but GHG removals according to ISO 14064-3:2006 /32/), and Section 3.7.2 only refers to GHG emission reductions, the audit team deems that these requirements are not applicable to the project. In any case, if the requirements of 4.5.29 are assumed to be applicable to the project, the project would be in compliance as it claims removals from the SOC pool for only 20 years. As confirmed by the audit team through Breithaupt et al. (2012) /51/, from which the burial rate used in the project is indirectly sourced, the burial rate used to estimate the removals are centennial rates, meaning that they are averages for a 100 year period. Since these are applied for only 20 years, this means clearly that the project would never exceed the net GHG benefit generated by the project in 100 years.

In view of this, the audit team deems that the project is in compliance with the requirements set in Section 3.7.2 of the AFOLU Requirements.

3.2.6.5 Uncertainties associated with the calculation of emissions

All uncertainties in the ex-ante calculations /9/ have been considered following the requirements of CDM AR-AM0014 Version 3.0 /20/. The audit team confirmed that the uncertainties of all factors involved have been correctly calculated or that conservative values have been used (i.e., the lower or upper bound of the confidence interval).

For ex-post purposes, the uncertainties are related to data that is collected ex-post, such as the biometric data for the plantations or the planted areas.

3.2.7 Methodology Deviations

No methodology deviations have been identified.

3.2.8 Monitoring Plan

The project applies the approved monitoring methodology CDM AR-AM0014. The project monitoring plan is in compliance with the monitoring methodology CDM AR-AM0014 and the applicable tools listed in Section 3.2.1 of this validation report. The monitoring plan will give opportunity for real measurements of achieved net anthropogenic removals by sources. All data recorded and collected will be archived electronically until two years after the crediting period is over.

3.2.8.1 Data and parameters available at validation

The following parameters are determined ex-ante and verified by the audit team:

$\Delta C_{BSL,t}$	=	Baseline net GHG removals by sinks in year t. This is equal to zero as assessed in Section 3.2.6.1 of this validation report;
CF_{TREE}	=	Carbon fraction of tree biomass; tC t d.m. ⁻¹ . The project proponent has applied a value of 0.47 as required by the tool 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (version 4.1.0);
R_j	=	Root-shoot ratio for tree species j; dimensionless. For ex-ante and ex-post estimates, the project proponent has applied the equation $R_j = \exp[-1.085 + 0.9256 \cdot \ln(AGB)] / AGB$ which is prescribed by the tool 'Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities' (version 4.1.0);
$f(x_{1,l}, x_{2,l}, \dots)$	=	Above-ground biomass of the tree returned by the allometric equation for species j relating the measurements of tree l to the above-ground biomass of the tree; t d.m. In order to apply the allometric equation for ex-ante estimates, the project proponent sourced the average annual growth in DBH and H from Ray et al. (2011) /60/. The allometric equation used for ex-ante estimates was sourced from the same study. Although, this equation is only used for ex-ante estimates, the audit team is able to confirm that it is in compliance with the requirements set in Section 4.1.6 (2)-(6) as required by Section 3.1.4 of the VCS Standard. For ex-post estimation a new equation will be developed which complies with the tool 'Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities' (version 01.0.0);
DF_{DW}	=	Conservative default factor expressing carbon stock in dead wood as a percentage of carbon stock in tree biomass; per cent. For ex-ante estimation, a value of 1% has been applied which is the most conservative value provided by the tool 'Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM

project activities' (version 3.0.0). For ex-post estimation a different value may be provided;

- $dSOC_t$ = The rate of change in SOC stocks within the project boundary, in year t ; $t\ C\ ha^{-1}\ yr^{-1}$. The applicable methodology prescribes a value of $0.5\ t\ C\ ha^{-1}\ yr^{-1}$ for 20 years. However, the project proponent has assumed a default value of $1.62\ t\ C\ ha^{-1}\ yr^{-1}$ which is the rate provided by the IPCC document "2013 supplement to the 2006 IPCC guidelines for national greenhouse gas inventories: wetlands" /37/. As confirmed by the audit team by checking the literature referenced in the 2013 Wetlands supplement /51//52//54/, this value is applicable to mangrove restoration activities without rewetting as they provide real burial rates for mangrove ecosystems. The values are sourced from Breithaupt et al. (2012) /51/, which provides the latest and most complete estimates of global burial rates. According to such publication the burial rates vary mainly by latitude, showing the lowest burial rates at higher latitudes and the highest close to the equator. The audit team is able to confirm that the applied value is conservative for ex-ante and ex-post estimates based on the following two reasons:
- i) According to Breithaupt et al. (2012) /51/ the default value is a centennial burial rate while the methodology will only apply such a value for 20 years. The 2013 Wetlands Supplement in its page 4.27 indicates that the burial rates should be applied "until such time as stocks are equivalent to soil carbon stocks in natural/undrained settings with vegetation", meaning that the rates could be applied for at least 100 years;
 - ii) According to referred publication, burial rates in areas close to Mangrove forests are also high which would indicate that the organic matter is exported from the forests to nearby non-forested areas. The areas with high mortality, although being within the project boundary, will not be considered for the estimation of SOC removals which would make it conservative.
 - iii) The audit team checked the results provided by Mitra et al (2012) /61/ and Mitra et al. (2014) /62/ for the Sundarbans and was able to derive sequestration rates in the range of 1.2-1.5 tC/ha with only 5 years of data (2005-2010).

In view of this, the audit team confirms the acceptability of the default value of $1.62\ t\ C\ ha^{-1}\ yr^{-1}$. The default value would be in compliance with the requirements of Section 4.5.6, referred to in Section 3.1.5 of the VCS Standard regarding the use of default values:

1. Requirements regarding data collected from primary sources is not applicable since the default value used was based on secondary sources.
2. The default value is sourced from the IPCC supplement, which is a credible source and has been reviewed by the scientific community;
3. The IPCC wetland supplement was published in 2013, so the values are recent and accurately reflects available technologies and/or current practice, and trends, within the sector;
4. Requirements regarding sampling are not applicable, since no sampling was applied;
5. Data is publicly available as it is published in the 2013 IPCC wetlands supplement;
6. Data can be accessed in the IPCC webpage;
7. Data is appropriate to the geographical scope and project activities as justified and validated above;
8. No expert judgement has been applied to derive the default values;
9. The requirement regarding the data maintenance is not applicable.

Moreover, the audit team is able to confirm that the value is in compliance with the accuracy and conservativeness principle set in Section 2.4.1 of the VCS Standard as:

- a) It is an ecosystem specific value sourced from an acceptable source (IPCC) being in compliance with VCS requirements, so it is more accurate than the

- value provided in the methodology;
- b) The rates provided by the publication are centennial rates yet they will be applied only for the first 20 years which makes it extremely conservative;
 - c) Areas with high mortality will not be accounted despite the fact that these areas can sequester carbon from exports coming from neighbouring plantations.
- $EF_{CH_4,i}$ = Emission factor for CH₄ in stratum *i*. Emission factor for CH₄ in stratum *i*: The project proponent has used the default values for tropical areas considered in the tool for 'Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0), i.e. 6.8 g kg⁻¹ dry matter burnt;
- $EF_{N_2O,i}$ = Emission factor for N₂O in stratum *i*. Emission factor for N₂O in stratum *i*: The project proponent has used the default values for tropical areas used in the tool for 'Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0), i.e. 0.2 g kg⁻¹ dry matter burnt;
- $GW P_{CH_4}$ = Global warming potential for CH₄. This is equal to 21 according to the tool 'Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0);
- $GW P_{N_2O}$ = Global warming potential for N₂O. This is equal to 310 according to the tool 'Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0);
- $COMF_i$ = Combustion factor for stratum *i*. Combustion factor for stratum *i* (per vegetation type): The project proponent has used the default values for tropical areas used in the tool for 'Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity' (version 04.0.0), i.e. 0.46 (mean age 3-5 years), 0.67 (mean age 6-10 years), 0.50 (mean age 11-17 years), 0.32 (18 and above).
- E = Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary. The project proponent has chosen a 10% as required by the applicable methodology.
- t_{VAL} = Two-sided Student's t-value, at infinite degrees of freedom in the first iteration and at degrees of freedom equal to (n-1) in subsequent iterations, for the required confidence level (t_{VAL}): The project proponent has used a 90% Two-sided Student's t-value which is equal to 1.67 for infinite degrees of freedom.

The audit team is able to confirm that the use of the default data stated above avoids any overestimation of the net anthropogenic GHG removals by sinks.

3.2.8.2 Data and parameters monitored

The following data and parameters will be monitored in accordance with CDM AR-AM0014:

- A_i = Area of stratum *i*, ha. For ex-ante estimates this has been estimated based on the project boundary geographical data which was assessed in Section 3.2.3 of this validation report and on the stratification based on the ecological condition (i.e. defined by IUCN at the time of the project design of the project) and based on the planting year. The total value is equal to 4,004 ha. The area of each stratum will be measured using GIS and other spatial information software.
- The parameters $A_{PLANT,t}$ and A described in Section 3.2.6.2 of this validation report will be estimated based on the referred parameter. The former will be estimated

	correcting for mortality in order to ensure conservativeness in the application of the SOC removal rate factor. The latter will be estimated summing up the areas of all strata;
n	= Number of sample plots required for estimation of biomass stocks within the project boundary. This is estimated at each verification event considering the values of s_i , E and t_{VAL} and applying the tool 'Calculation of the number of sample plots for measurements within A/R CDM project Activities' (version 2.1);
w_i	= Relative weight of the area of stratum i . This is done at each verification event considering the values of Area of tree biomass stratum i (A_i). For ex-ante estimations it has been derived from the initial stratification as described above in A_i ;
s_i	= Estimated standard deviation of biomass stock in stratum i , t d.m. ha ⁻¹ . This is estimated at each verification event considering previous inventories. For ex-ante estimations the actual standard-deviations observed in the first verification were used;
$A_{PLOT,i}$	= Area of sample p in stratum i , ha. The plot area will be measured following specific SOPs. In order to assure the QA/QC in the measurements, 10% of sampling plots are re-measured in order to confirm that the plot area has been determined adequately. This is done at each verification event. This is not relevant for ex-ante estimations of GHG benefits, and it is assumed a value of 1 ha. For ex-ante estimation of the number of sample plots a value of 0.01131 ha is assumed.
$A_{BURN,i,t}$	= Area of land subjected to use of fire to clear the land of harvest residue prior to replanting of the land in year t . The area of each stratum will be measured with GPS or any other spatial information available. This area is measured whenever forest fire occurs. For ex-ante estimates it is assumed to be zero.
X_i	= Variables measured per tree for the calculation of above-ground biomass an allometric equation for species. This will be defined for each verification. For ex-ante estimates it has been assumed to be the DBH and H.
T	= Time period elapsed between two successive estimations of carbon stock in trees. This is determined at each verification event. This is not relevant for ex-ante estimations as it is assumed that it is equal to 1.

The audit team confirmed that the list of parameters is complete and that the values assumed for ex-ante calculations will lead to precise or at least conservative estimations and that the procedures for ex-post estimations are complete and in accordance with the applicable methodology.

3.2.8.3 Applicability and eligibility of monitoring equipment and procedures

The audit team confirmed that there are specific procedures defined indicating clearly the frequency, responsibility and the scope of each action. Furthermore, there are SOPs integrated in the management system of the project proponent which guide the monitoring of the PSPs /12/. The project proponent has defined the QA/QC procedures to be applied for the following tasks:

- SOPs for field measurements: Persons involved in the measurements shall be trained and shall adhere to the SOPs.
- Data collection. A qualified person will be part of the inventory teams.
- Data entry and analysis. Data will be reviewed.

- Data maintenance and archiving. All data will be archived in durable media and stored in multiple locations.

Detailed information has been properly addressed in the PD. During the site visit, the audit team was able to verify that necessary procedures related to data handling, quality assurance, and training of operating and monitoring personnel have been appropriately implemented.

In conclusion, the application of the monitoring methodology is transparent and the audit team considers that the project proponents are able to implement the monitoring plan.

3.3 Non-Permanence Risk Analysis

Following the provisions of paragraph 3.19.2 of the VCS Standard Version 3.5, a non-permanence risk report (NPRR) was prepared following the provisions of the AFOLU Non-Permanence Risk tool: VCS Version 3.2 and submitted to the audit team. The findings and conclusion regarding the non-permanence risk analysis undertaken for the project are summarized below for each risk category and factor. Unless noted otherwise, the audit team agrees with the conclusion stated in the non-permanence risk report.

The findings of the audit team regarding the risk scores applied for each factor are as follows.

Project Management		
Risk Factor	Validation Findings	Risk Rating
a)	80% of the employed species are <i>Avicennia sp.</i> while the remaining 20% includes: <i>Rhizophora</i> , <i>Bruguiera</i> , <i>Cerriops</i> , <i>Xylocarpus</i> , <i>Excoecaria</i> , <i>Aegiceras</i> and <i>Aegialitis</i> species. Seedlings are established in areas that were previously covered with mangrove species. Hence, the audit team agrees that this risk is not relevant.	0
b)	As confirmed during the site visit, there is little threat of encroachment from outside actors. The project is located in areas where the uses are compatible with the existence of mangrove forests and in fact mangrove forests enhance these uses (i.e. increase in fish habitat) and local communities are being engaged in different social programs. Hence, the audit team agrees that this risk is not relevant.	0
c)	The audit team confirmed that the project management team includes individuals with significant experience in all skills necessary to successfully undertake all project activities. This was evident during the site visit, when it was confirmed that project areas are managed by a very professional team which includes senior staff with experience in the management and implementation of the project. Moreover, Livelihoods Fund provides all the necessary technical support in order to ensure the correct management of the existing plantations. Hence, the audit team agrees that this risk is not	0

	relevant.	
d)	As confirmed during the site visit, the project management team has a permanent presence in the project areas and NEWS has offices which are located less than a few hours from the project areas. Moreover, NEWS has in each zone collaborators with whom they are constantly in communication in the case any issue occurs. Hence, the audit team agrees that this risk is not relevant.	0
e)	The current project was validated as a CDM project but was never registered. Hence, the audit team agrees that the management team includes individuals with significant experience in AFOLU project design and implementation, carbon accounting and reporting under the VCS Program.	-2
f)	The NPRR discusses the existence of an adaptative management plan and evidence has been provided to support it. The audit team checked the provided Management and Financial plan /13/ and confirmed that it includes instructions to identify and assess potential risks to the project and requires the implementation of a mitigation plan. Moreover, evidence was provided that periodical PRAs were conducted /19/ which are used in order to identify any potential issue. As confirmed by the audit team and stated in such plan, the exact procedures are provided in the MoU between NEWS (implementing partner) and Livelihoods Fund (project proponent) for the monitoring and mensuration of impacts of the project /3/. This contract includes the responsibilities of each of the parties and includes specific procedures for the monitoring of the project (e.g. every three years an assessment by Livelihoods Fund will be conducted in order to confirm the status of the plantation and any mitigation action required) which includes the identification of risks and the implementation of the necessary mitigation actions. As confirmed by the audit team, any potential mitigation action is already budgeted in the contract, and as confirmed during the site visit, this adaptative management plan is implemented. Therefore, the audit team agrees that the project can claim the mitigation score of -2 due to the existence of an adaptative management plan.	-2
Total Project Management (PM) [as applicable, (a + b + c + d + e + f)]		-4
Total may be less than zero.		

Financial Viability		
Risk Factor	Validation Findings	Risk Rating

a)	The audit team checked the revised spreadsheet with the project financials /13/ and confirmed that all assumptions were supported by documentary evidence such as contracts, and that conservative assumptions were applied /11/. Hence, the audit team deems the provided financials to provide a conservative estimate of expected cash-flows for future years considering socio-economical local circumstances. According to the financials, the break-even point would be reached in year 2021 which is between 4 and 7 years from the current assessment. Therefore, the audit team agrees that the risk would be 1.	1
b)		
c)		
d)		
e)	According to the financials the maximum level of investment until the project reaches break-even would be 1,259.6 kEUR. The audit team deems that the Livelihoods Fund should not have any problem in meeting this cash-out since it is participated in by large companies (e.g. La Poste, SAP AG, Danone) who have plenty of private equity for investing and are in good financing standing according to the audit team competence. The fund is participated in by large companies who decide in board meetings whether or not to invest in a project. If an investment is decided upon, each entity will commit to the expenditures for the entire duration of the project pro-rata to their participation in their fund. The final disbursement is done on an annual basis approved by the board meeting. This was confirmed by the audit team through CACEIS Bank's capital participation and current account status information /11/ which shows that the fund has committed already to 20 million EUR including the expenditures of the proposed project activity /11/, having remaining funding of 10 million EUR. The fund assumes for the financials that the carbon credits generated have a market price, but they use them for compensating for their own emissions as part of their voluntary commitments. Both the funding and the revenues may be considered secured revenue which means that the 100% of the cash-out until the project reaches break-even would be covered.	0
f)		
g)		
h)		
i)	As assessed above the project proponent has enough callable financial resources of more than 50% of the total cash-out. The fund is participated by large companies who decide in meeting boards to invest or not in a project. If an investment is decided, each entity will commit to the expenditures for the entire duration of the project pro-rata to their participation in their fund. The final disbursement is done in an annual basis approved by the meeting board but the funds are already allocated to the project based on the approved investment plan. This was confirmed by the audit team through CACEIS Bank's capital participation and current account status information /11/ which shows that the fund has committed already to 20 million EUR including the expenditures of the proposed project activity /11/. This commitment can be mobilized annually, so it is a secured funding that is readily available to the project, therefore being in compliance with Section 2.2.2 (5) of the AFOLU Non-Permanence Risk Tool. Hence a mitigation factor of -2 may be claimed.	-2

Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)]	0
Total may not be less than zero.	

Opportunity Cost		
Risk Factor	Validation Findings	Risk Rating
a)	As assessed in Section 3.2.4 of this validation report, the baseline scenario is the continuation of the land-use prior to project start, i.e. continuation of degraded mangrove with very little activity from local communities (i.e. prawn-seed collection). Although prawn-seed collection may generate a revenue so it would theoretically not be subsistence-driven, it was confirmed during the site visit that this is not a real alternative land-use scenario once the project is established, since this activity can only occur on mudflats without vegetation so once the project is established it is not physically possible to continue with these activities. The only option would be to deforest these newly established forests, which cannot occur as confirmed by the Department of Forests and local communities and government. Moreover, as indicated by The World Bank, the elimination of the prawn-seed collection will have positive impacts on the availability of resources as for every prawn seed collection a significant number of species are affected (i.e. 400 including 318 (other prawns), 8 (fish), 60 (crabs), 1 (mollusc), 13 (unidentified)) /59/. Hence, there are very few baseline activities, and where they exist, these are subsistence-driven, which indicates an opportunity risk at least of zero. The project will restore the mangrove which will increase the fish habitat and its population and will increase the prawn-seed production elsewhere. Hence, the project will generate positive community benefits. This was confirmed through interviews with stakeholders who confirmed this extent. Hence a risk of zero is appropriate.	0
b)		
c)		
d)		
e)		
f)		
g)	Project proponent is not a for-profit organization; they are carrying-out investments in order to use the carbon credits for compensating their own emissions, yet the main driver of their investments are the community benefits.	-2
h)	The project has in place signed agreements with the different Rural Communities /3/ which state clearly that they commit to conserve the carbon stocks until tree maturity and that they will respect the project activities for the whole project's length. This agreement is a legally binding commitment to continue management practices that protect the credited carbon stocks over the length of the crediting period as required by Section 2.2.3 of the AFOLU Non-Permanence Risk Tool. Moreover, as confirmed by the audit team, once the plantation reaches maturity they would be protected by the existing laws	-2

	which do not allow any deforestation of Mangroves /35/. This was effectively confirmed during the interview held with the representative of the Department of Forests. In view of this, the audit team confirms that the project may claim the mitigation factor.	
i)	This has not been argued.	0
Total Opportunity Cost (OC) [as applicable, (a, b, c, d, e or f) + (g+h or i)]		-4
Total may be less than 0 as indicated by the VCSA in the "Errata and clarifications" dated 24 July 2014 (c.f. http://www.v-c-s.org/sites/v-c-s.org/files/Errata%20and%20Clarifications%2C%20AFOLU%20Non-Permanence%20Risk%20Tool%2C%20v3.2_0.pdf)		

Project Longevity		
Risk Factor	Validation Findings	Risk Rating
a)	The project has in place signed agreements with the different Rural Communities /3/ which state clearly that they commit to conserve the carbon stocks until tree maturity and that they will respect the project activities for the whole project's length. This agreement is a legally binding commitment to continue management practices that protect the credited carbon stocks over the length of the project longevity period as required by Section 2.2.3 of the AFOLU Non-Permanence Risk Tool. Moreover, as confirmed by the audit team, once the plantation reach the maturity they would be protected by the existing laws which does not allow any new conversion of existing Mangroves /35/. The project proponent has argued a project longevity period of 50 years, which is consistent with the management and financial plan which includes procedures and an overall budget for the 50 years has been provided by the project proponent /13/. According to the same, the first 30 years will be articulated through the contract between the project proponent and the implementing partner, which includes a detailed financial commitment for 10 years which will be updated at least twice. According to the management plan, after the first 30 years the communities will be in charge of the operation of the project. Moreover, a Letter to The Director of Sundarban Biosphere Reserve (Department of Forests) attaching the financial and management plan of the project covering 50 years was provided /14/. Moreover, it was confirmed during the interviews held with the Pradhans of the Panchayats (local government) that the agreements signed with them may be renewed as many times as desired. Although the agreements cover a 20 year period, the project proponent is renewing the agreements after each local election in order to ensure that the new local government representatives are endorsing the project. Therefore, the right of use	5
b)		

	may be maintained for the entire project longevity as required by Section 2.2.4 (2) of the AFOLU Non-Permanence Risk Tool. Therefore, in accordance to the AFOLU Non-Permanence Risk Tool, Section 2.2.4 it may be confirmed that the project longevity is 50 and that the resulting risk is 5 as there is a legal agreement to continue the management practices.	
Total Project Longevity (PL)		5
May not be less than zero		

Land Tenure and Resource Access/Impacts		
Risk Factor	Validation Findings	Risk Rating
a)	As assessed in Section 3.1.9 of the validation report, the land is public land while the right of use is vested in the project proponent. Hence, a risk of 2 is applicable.	2
b)		
c)	There are no disputes as the ownership is of the state and the management is competence of the local Panchayats. During the interview held with the three Pradhans (presidents) of the local Panchayats it was confirmed that the land is public land and that the land use is under jurisdiction of the local government. Moreover, the selection of the planting areas has been done in consultation with local communities with support by the implementing partner as confirmed during the site visit and through other evidence /17/.	0
d)	As assessed above, there are no disputes over access/use rights in the project area. Hence, the audit team agrees that this risk is not relevant.	0
e)	The audit team agrees that the potential upstream and sea impacts that could undermine issued credits in the next 10 years are irrelevant or expected to be insignificant was demonstrated through the following: a) The project is a tidal wetland restoration or coastal wetland so the only potential impact could be linked to the reduction in flow in the Metla and Ganges rivers. These rivers have a very high flow and it is not expected that their flows will be significantly affected unless a large derivation or dam is implemented upwaters. However, this is not expected to occur as confirmed by the staff of the forest department, who confirmed that new laws have been established in order to ensure that coastal wetlands are protected and this includes protection against large projects b) The project has in place as part of its management plan, monitoring instructions to ensure that the project areas are monitored and in the case of any issues that could cause mortality on the plantations, the project would	0

	implement a set of mitigation actions which are budgeted in the plan /3/. Therefore, any negative impact would be identified and addressed. c) As confirmed during the site visit through interviews and through literature review, no deforestation or degradation has been caused by these changes in water flow. Wetlands have disappeared due to erosion but this is not related to the impact referred to in the requirement. d) Moreover, as confirmed by the audit team, the project area is divided in more than 464 polygons that are dispersed in different areas that belong to different hydrological systems. This would mean that carbon stocks are not concentrated in one unique system, so in the case of any change in the upstream and sea impacts it would be highly unlikely that these affects the whole project area or a significant part of the area. In view of this, the audit team agrees that this risk is irrelevant in the case of the project activity and agrees to set this risk to zero. Since the NPRR has been updated with this discussion, this finding has been resolved.	
f)	As explained in the project longevity risk this mitigation factor may be claimed by the project as the project area is protected by legally binding commitment to continue management practices that protect carbon stocks over the length of the project crediting period	-2
g)	Mitigation not argued by the project proponent.	0
Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e+ f+g)]		0
Total may not be less than zero.		

Community Engagement		
Risk Factor	Validation Findings	Risk Rating
a)	The audit team confirmed during the site visit that no households live within the project area. Hence, the audit team agrees that this risk is not relevant.	0
b)	The audit team confirmed during the site visit that the main activities developed close to the project areas is firewood collection and prawn-seed collection As confirmed during the site visit these activities are concentrated in areas of mangrove as the degraded areas are poor in fish and oysters. During the site visit the audit team confirmed the process followed by the implementing partner to establish the plantations: the first step was to arrive to a village and organize a meeting explaining the negative impacts of the mangrove degradation and explaining how it can be restored. After that, a discussion would be held in order to understand the comments from communities, their consent for the activities and the areas that could have potential to be reforested. The audit team confirmed	0

	during the site visit that these consultation were organized in all villages that participate in the project; meeting minutes were provided demonstrating these actions /19//17//18//10/. Hence, it can be confirmed that more than 20% of the communities living out of the project area and who rely on the project area have been consulted.	
c)	The audit team confirmed that the project is delivering of net positive impacts on the social and economic well-being of the local communities who derive livelihoods from the project area. This was confirmed through different interviews with stakeholders who confirmed that the project will defend them from the effect of cyclones and that it will increase in fish and prawn availability. The project has not caused any harm in any livelihoods as confirmed by the same stakeholders. In view of this, the audit team is able to confirm that the positive community benefits are obvious and that the project may claim a mitigation factor of -5.	-5
Total Community Engagement (CE) [where applicable, (a+b+c)]		-5
Total may be less than zero.		

Political Risk		
Risk Factor	Validation Findings	Risk Rating
a)	The audit team confirmed that the mean governance score for India for the period 2009 - 2013 across the six governance indicators of World Bank Institute's Worldwide Governance Indicators (WGI, 2014 update) is -0.19. Therefore, the audit team agrees that the political risk is 2.	2
b)		
c)		
d)		
e)		
f)	The audit team checked the websites of the Forest Carbon Partnership Facility /38/ and UN-REDD /39/ and confirmed that India has not prepared any Readiness preparation proposal to be approved by the World Bank and UN. However, a CDM AR project has been registered in the country as confirmed through the UNFCCC database /40/. Therefore, the mitigation score of -2 can be confirmed.	-2
Total Political (PC) [as applicable ((a, b, c, d or e) + f)]		0
Total may not be less than zero.		

Natural Risk		
Risk Factor	Validation Findings	Risk Rating
F	As confirmed during the site visit this risk is not relevant in mangrove ecosystems due to the presence of water. This was confirmed by the representative of the Department of Forests during the interview held.	0
PD	The project proponent has selected a significance of Minor (5% to less than 25% loss of carbon stock) and a likelihood of "Less than every 10 years". The audit team checked various parcels during the site visit and confirmed that young plants are affected by some insects, yet this effect is minor and but frequent. This is confirmed by the plantation monitoring reports for 2014 and 2015 that indicate that 93% of plants are not affected by any pest /10//18/, but they do not cause a mortality to affected trees. The reduced frequency in insect attack was confirmed by the representative of the Department of Forests, who indicated than only young trees are affected by pests. Therefore, a frequency of less than 10 years and a significance of "No Loss" or "Insignificant" would be reasonable. Since there is less than 10 years in available data, the project proponent has assumed a conservative significance of "Minor", meaning a risk of 5. As confirmed during the site visit, these insects only affect certain species so the use of a mix of species in the plantations seems to be a good strategy in order to mitigate this risk; hence a mitigation factor of 0.5 may be argued.	2.5
W	The project proponent has selected a significance of Insignificant and a likelihood of "Less than every 10 years". As indicated by The World Bank's report "Building Resilience for Sustainable Development of the Sundarbans" /65/, cyclones is the most important natural hazard which occurs once every 10 years. Although this is one of the most important natural risks to human life and livelihoods, it is not a natural risk that affects carbon stocks in mangrove forests /64/. According to Vyas and Sengupta (2013) /67/ mangrove forests do mitigate the impacts of cyclones and are not affected by these. Moreover, during the interview held with the representative of the Department of Forests, it was indicated that mangrove forests are not negatively affected by cyclones but are positively affected as bring more nutrients and water to forests inland. This means that a frequency of "Less than every 10 years" is reasonable, while a significance of "No Loss" would also be reasonable. However, the project proponent has conservatively assumed a significance of "Insignificant", meaning a risk of 2, which is correct as there is not a long historical series of data available. Hence, a risk of 2 would be conservative.	2
G	Two possible geological risks are earthquakes and river erosion. The former is not relevant as confirmed through interviews with different stakeholders, who indicated that earthquakes never happened in those areas. The latter is the most	10

	relevant in this case. The project proponent has selected a significance of Major (25% to less than 50% loss of carbon stock) and a likelihood of "Less than every 10 years". Since erosion is a continuous effect the selected likelihood is accurate. Regarding the significance, the audit team deems that it is conservative as the project area is scattered in a large area and it would be unlikely to have more than 25% of the project area affected in less than 10 years. This was effectively confirmed by the representative of the Department of Forests, who indicated that this risk is relevant but that this is more relevant in the areas that are exposed to the sea, and not much in the river areas. This is confirmed by Hazra (2010), who showed that accretion tends to occur in the river areas and erosion occurs in the exposed coastal areas /58/. In view of this, it may be confirmed that a significance of "Major" would be conservative, and a risk of 20 would be acceptable. As confirmed during the site visit, in order to mitigate this risk the project proponent has established a site selection procedure /17/ in order to establish plantations only on stable areas that are unlikely to be affected by erosion. In view of this, a mitigation factor of 0.5 may be claimed as mitigation measures have been put in place. Therefore, a risk of 10 can be claimed.	
ON	Not relevant as confirmed by the audit team during the site visit.	0
Total Natural Risk (as applicable, F + PD + W + G + ON)		14.5

In summary, the overall risk rating that was determined for the project, in accordance with the VCS Non-Permanence Risk Tool, is 10%. The audit team has concluded that the above risk rating is in conformance with the VCS rules.

Risk Category	Rating
a) Internal Risk	0
b) External Risk	0
c) Natural Risk	14.5
Overall Risk Rating (a + b + c)	15 %

The audit team confirmed that the non-permanence assessment has been carried out adequately and applying conservative assumptions where needed.

Therefore, the total buffer credits foreseen in the proposed project activity are: Buffer credits = $1,024,976 \times 15\% = 153,746 \text{ tCO}_2\text{e}$ in the crediting period.

3.4 Environmental Impacts

The local legislation does not require to conduct EIA for restoration projects. This was confirmed during the interview held with the representative of the Department of Forests who confirmed this extent and

also through the LoA /6/ that represents a formal confirmation that the project complies with all environmental regulations.

According to the EIA assessment provided to the DNA and summarized in the PD, only positive impacts were identified which was verified by the audit team during the site visit.

3.5 Comments by Stakeholders

The audit team confirmed that many consultations were conducted with relevant stakeholders. These consultations were conducted prior to the establishment of the plantations and as part of the area selection procedure /19/. The consultations were organised in all villages that participate in the project; meeting minutes were provided demonstrating these actions/17//19/.

Moreover as confirmed with the Department of Forests, the project proponent conducted various meetings with relevant stakeholders of the government and the social society.

The audit team is able to confirm that the local stakeholder consultation has been carried out adequately.

4 VALIDATION CONCLUSION

The project correctly applies the methodology “Afforestation and reforestation of degraded mangrove habitats”, Version 3.0.

The total VCUs from the project in the crediting period are expected to be 871,230 tCO₂e. The project is likely to achieve the estimated GHG emission reductions and removals that are described in the project description.

The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is the audit team's opinion that the project participants are able to implement the monitoring plan.

The project conforms to the validation criteria for projects, as set out in the VCS Version 3 guidance documents referenced in Section 1.2 of this report. No qualifications or limitations exist with respect to the validation opinion reached by the audit team. Hence, SCS recommends the registration of the project as a VCS project activity.

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APPENDIX A: LIST OF FINDINGS

The following tables include all findings issued during the validation audit. It should be noted that all language under “Client Response” is a verbatim transcription of responses provided by project personnel.

NCR 2015.1 dated 02/19/2015

Standard Reference: VCS Standard, Version 3.4, Section 3.18.1; VCS Project Description Template, Version 3.2, Section 4.1.

Document Reference: 2015-02-11 Project Description NEWS

Finding: The VCS Standard, Section 3.18.1 requires project proponents to use the VCS Project Description Template and to adhere to all instructional text within the template. According to the VCS Project Description Template, all parameters that are determined or available at validation, and remain fixed throughout the project crediting period have to be provided in Section 4.1 in compliance with the applicable methodology. The accurate value has to be provided in the relevant field. Section 4.1 of the provided PD provides parameter ΔCBSL_t , which is equal to 42,602. However, Section 3.1 of the PD states that the value for this parameter is equal to zero.

Client Response: The carbon stock in the baseline value was re-calculated and the new data were updated in the PD.

Auditor Response: The audit team checked the revised PD (Version 2.0) and found that the value of parameter ΔCBSL_t has been revised. However, this value is still different from the value provided in section 3.1 of the PD, i.e. zero value. Please note that the parameter refers to baseline net GHG removals not baseline carbon stocks.

Client Response 2: The parameter has been revised and corrected as zero value. Calculation of pre-existing tree and shrub biomass has been updated. Baseline removals is zero in section 4.1

Auditor Response 2: The audit team checked the revised PD and confirmed that the issues has been corrected. The parameter baseline net GHG removals has been set to zero, which is consistent with Section 4.1 of the PD. Therefore the issue has been resolved and the finding may be closed.

Closing Remarks: The Client's response adequately addresses the finding.

NCR 2015.2 dated 02/19/2015

Standard Reference: VCS Standard, Version 3.4, Section 3.18.1; VCS Project Description Template, Version 3.2, Section 4.1.

Document Reference: 2015-02-11 Project Description NEWS

Finding: The VCS Project Description Template, Section 1.8 requires project proponents to provide an accurate description of the project activity. According to the PD the total project area is 4,550 ha. In order to check the accuracy of this value the audit team checked the ESRI Shapefile provided with the geographical area of the project and found the following: a) The area of strata 1-4 (c.f. 30-01-2015 NEWS All strata plot boundaries) is well above 4,550 ha; b) The audit team conducted a topology check of the ESRI Shapefile (c.f. 30-01-2015 NEWS All strata plot boundaries) and identified that some polygons overlap (e.g. ID 291 with 245; 48, 49 with 456; 23 with 407, 307 with 233, 94 with 321; 182 with 323, etc.). Therefore, the total project area provided in the PD is not in compliance with the referred criteria.

Client Response: A new revised project shape file showing all areas of the first project instances is provided in the drop box as supporting information. The areas have been updated in the PD in section 1.1 and a summary table is included in section 1.8 of the PD

Auditor Response: The audit team reviewed the revised project shapefile and found that all issues have been solved. The figures shown in the PD are consistent with the revised PD, and the calculations too. Therefore, this finding has been solved and may be closed.

Closing Remarks: The Client's response adequately addresses the finding.

NCR 2015.3 dated 02/19/2015

Standard Reference: VCS AFOLU Requirements, Version 3.4, Section 3.1.6 and 3.1.7

Document Reference: 2015-02-11 Project Description NEWS

Finding: a) According to the VCS AFOLU Requirements, Section 3.1.6, the onus is upon the project proponent to demonstrate that ARR project areas were not cleared of native ecosystems to create GHG credits. The resulting non-forested areas are new mud-flat areas or degraded Mangrove ecosystems that currently has scarce vegetation cover, meaning that are degraded ecosystems which the project intends to restore. Although the audit team confirmed that the project area would comply with the referred eligibility requirement, the VCS PD does not provide a description on how the land eligibility was confirmed.

b) According to the VCS AFOLU Requirements, Section 3.1.7 the project description shall provide evidence that any AFOLU project area was not drained or converted to create GHG credits. The audit team confirmed through different evidence that the lands where the project has been implemented are new mudflats or is a degraded Mangrove ecosystem where degradation has occurred. However, the VCS PD does not provide a description on how it has been demonstrated that the project area was not drained or converted to create GHG credits.

Client Response: Under section, 2.2 of the PD a section was included (page 30) on these two specific VCS AFOLU requirements. Supporting documentation is provided also in the drop box as part of the adaptive management risk assessment. Another document of evidence is the manual of the mangrove plantation in the Sunderbans which a copy was shared during the field visit.

Auditor Response: The audit team checked the revised PD (Version 2.0) and found that it now provides in Section 2.2 a full demonstration that the lands where the project is established complies with the land eligibility criteria defined in Section 3.1.6 and 3.1.7 of the AFOLU Requirements. Therefore, the PD is now complete and in compliance with the VCS rules. In view of this, the team concluded that the finding was resolved and that it could be closed.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2015.4 dated 02/19/2015

Standard Reference: VCS Standard, Version 3.4, Section 3.1.1 and 2.4.1; AR-AM00014, Version 3.0.0, Section 17.

Document Reference: 2015-02-11 Project Description NEWS

Finding: The VCS Standard, Section 3.1.1 requires projects to be guided by the principles set in Section 2.4.1 which includes the principles of accuracy and conservativeness. According to the applied methodology AR-AM00014, Section 17, a default value of 0.5 t ha⁻¹ yr⁻¹ for the rate of change in SOC stocks within the project boundary may be adopted unless transparent and verifiable information can be provided to justify a different value. The project proponent has applied a default value of 1.62 t C ha⁻¹ yr⁻¹ sourced from Table 4.12 of the IPCC “2013 supplement to the 2006 IPCC guidelines for national greenhouse gas inventories: wetlands”. The audit team checked the mentioned document, and it states that where the activity results in patchy or patches of biomass, EFRE >0 should only be applied when the mangrove covers at least 10% of the overall area. The audit team checked the carbon inventory data that is in preparation and found that some plots have negligible biomass. However, it is not clarified in the PD how this value would be applied to areas that do not reach the required canopy cover in order to ensure that accurate and conservative estimates are obtained as required by the VCS Standard.

Client Response: Section 3.2, page 51/52 of the PD explains the procedure to exclude areas for applying the dSOC value now showing as example all areas excluded for the first monitoring period

Auditor Response: The audit team checked the revised PD (Version 2.0) and found that it now includes an explanation on how those areas that do not reach the minimum canopy cover of 10% would be excluded in the accounting of the GHG removals from the SOC pool. Therefore, the team concluded that the issue has been resolved and that the finding may be closed.

Closing Remarks: The Client's response adequately addresses the finding.

NCR 2015.5 dated 03/14/2015

Standard Reference: AFOLU Guidance: Additional guidance for VCS Afforestation, Reforestation and Revegetation projects using CDM Afforestation/Reforestation Methodologies; Program Definitions, Version 3.5.

Document Reference: 2015-02-11 Project Description NEWS

Finding: The "AFOLU Guidance: Additional guidance for VCS Afforestation, Reforestation and Revegetation projects using CDM Afforestation/Reforestation Methodologies" states that the VCS rules take precedence over the CDM requirement where a conflict exist. According to the guidance CDM methodologies may be applied to both afforestation/reforestation activities and revegetation activities provided these activities comply with the definition given by the VCS rules. According to the VCS Program Definitions, afforestation/reforestation and revegetation projects shall occur on land that was not forested at the time of the starting date, i.e. lands that did not comply with the forest definition. The audit team checked the ESRI Shapefile with the delineation of the eligible area and found that few polygons (e.g. 4-M22-2, 4-M18-4, 4-ST15-1, 4-S1-1, etc.) contained areas that were forested at the time of the start date. Therefore, not all lands within the project area are not in compliance with the VCS rules as it contains areas that do not comply with the definition of Afforestation/Reforestation and Revegetation activities.

Client Response: A revised project area shape file is provided in the drop box - Total areas in PD and MR are updated accordingly

Auditor Response: The audit team checked the revised ESRI Shapefile and confirmed that all areas that were forest in 2010 were removed. Now the project area conforms with the definition of an ARR project. Hence, the issue has been resolved and the finding may be closed.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2015.6 dated 03/14/2015

Standard Reference: "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in AR CDM project activities", Version 4.1.0.

Document Reference: 2015-02-11 Project Description NEWS

Finding: The applicable tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in AR CDM project activities" provides methods to determine carbon stocks of the tree and shrub component. These are estimated separately and summed together. While the former may be estimated through the canopy cover method or a full inventory, the latter may only be determined applying the canopy cover method. The audit team checked the PD and found that the project proponent has determined the carbon stocks using solely the canopy cover method for shrubs. The audit team confirmed during the site visit and through visual interpretation of fine satellite imagery that there were isolated pre-existing trees at the time of the start date of the project; however, the carbon stocks of these pre-existing trees has not been determined by any of the prescribed methods. During the site visit it was clarified that the reason for this is that the percentage of canopy cover assumed for shrubs is extremely conservative (i.e. >85%), so trees are already accounted in the shrub component. Although the team agrees that the percentage of canopy cover is conservative, it is not clear whether this conservativeness will ensure that carbon in the tree component is accounted for as the canopy cover is affected by the parameter BDR (i.e. 0.1), which is not present in the canopy cover method for trees. Please provide additional information in order to confirm that the carbon in the tree component is actually accounted for.

Client Response: A revised crown cover analysis was done now separately for pre-excising trees and shrubs in Stratum 4. The analysis supplementary information is in the drop box, under baseline analysis; Kml file showing the random points and clusters and the excel file showing the overall results of the CC analysis. Explanation was added to the PD, section 3.1 page 42 ff

Auditor Response: The audit team checked the revised PD (version 2.0) and confirmed that it has been updated. It now provides an estimation of the average crown cover across the project area for trees and shrubs. The crown cover estimation has been done with 24 clusters of 100 points each which are interpreted using fine resolution imagery for 2010 from Google Earth. The audit team checked the ESRI Shapefile with the interpretation and revisited 10 points and confirmed that the interpretation was accurate. The audit team checked the results and confirmed that the values reported in the PD are conservative. These values have been used in order to estimate the baseline carbon stocks which are discounted from the estimation of GHG removals. In view of this, the audit team confirmed that the issue was resolved and confirmed that the finding may be closed.

Closing Remarks: The Client's response adequately addresses the finding.

NCR 2015.7 dated 03/14/2015

Standard Reference: AR-AM0014, Version 3.0.0; "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in AR CDM project activities", Version 3.0.0.

Document Reference: 2015-02-11 Project Description NEWS; 2015-01-27 TARAM Ex-Ante S4;

Finding: According to the applicable methodology AR-AM0014, if a certain carbon pool is included within the project boundary, the carbon stocks in this carbon pool have to be estimated for the baseline and the project scenario. According to Section 2.3 of the PD, the dead wood pool is included within the project boundary, and according to Section 3, the carbon stocks in this pool will be estimated through the default method prescribed by the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in AR CDM project activities" which consists in estimating it out from the tree carbon stocks through the application of a default factor which in this case is 0.06. The audit team checked the calculation spreadsheet of the baseline carbon stocks (c.f. 2015-01-27 TARAM Ex-Ante S4) and found that the dead wood carbon stocks have not been calculated. Therefore, the calculations are not in accordance to the applicable methodology.

Client Response: Dead wood as a default value calculation (6%) was included in the baseline (Section 3.2) as part of the new pre-existing tree crown cover analysis. The TARAM file ex-ante was updated

Auditor Response: The audit team checked the exante calculations and the PD (version 2.0) and confirmed that they have been revised. They now include the dead wood pool, which has been estimated through the default method used also for estimation the actual GHG removals. The audit team checked the calculations and confirmed that they are correct. Therefore, this issue has been resolved and the finding may be closed.

Closing Remarks: The Client's response adequately addresses the finding.

NCR 2015.8 dated 04/28/2015

Standard Reference: AR-AM0014, Version 3.0.0; "Combined tool to identify the baseline scenario and demonstrate additionality in AR CDM project activities" (Version 1.0)

Document Reference: 2015-04-18 Project Description NEWS

Finding: According to the applicable methodology AR-AM0014, the selection of the baseline scenario has to be done following the "Combined tool to identify the baseline scenario and demonstrate additionality in AR CDM project activities". The audit team identified the following issues in the application of the tool:

- a) According to the Paragraph 13 a barrier of due to social conditions, includes "Lack of skilled and/or properly trained labour force" and "Lack of organisation of local communities", while Institutional barriers include "Risk related to changes in government policies or laws" and "Lack of enforcement of land-use-related legislation". As part of the discussion of Scenario 3, the PD indicates that this scenario faces a barrier "primarily related to a lack of transparent government capacity to engage with stakeholders"; barrier that will be addressed by the project through "a first attempt in the region to include the communities in mangrove plantations and to institutionalize this engagement". This has been argued as an institutional barrier, yet according to the tool it is more related to a barrier due to social conditions.
- b) According to paragraph 32-34, that establishes procedures for conducting the common practice analyses, the analysis consist in a three-step procedure: firstly the project proponent must identify the geographical region scope of the analysis; secondly, it must define to which extent similar forestation activities have been implemented; finally, if similar activities have been identified, it must compare the proposed project activity to the other similar forestation activities and assess whether there are essential distinctions between them. The PD, common practice analysis provides a discussion on whether the proposed project activity is a common practice. However, a) it does not state explicitly what is the geographical region of analysis; b) it mentions that 200 ha are implemented annually in the Sundarbans but it does not clarified if this is a similar activity to the proposed project (as defined by the CDM tool) and, if similar, whether there are essential distinctions with the proposed project activity.
- c) According to Section 2.4 of the PD, activities from the Department of Forests has account for 150 ha per year. In order to check the accuracy of this figure, the audit team checked Vyas & Sengupta (c.f. <https://www.mangrovesforthefuture.org/assets/Repository/Documents/Call-for-Action-and-Proceedings-from-2012-Colloquium-Mamallapuram-India.pdf>) and found that according to these authors, Mangrove established in the period 2000-2011 summed-up to 770 ha/year in average, which differs significantly from the previous one. However, the PD does not provide the source of the figure provided, so the audit team has not been able to compare both sources.

Client Response: a) For scenario 3 the barrier identified has been changed from institutional to social according to Paragraph 13. In the description of this scenario 3 institutional barrier has been changed to social

b) The section on common practice analysis has been completely revised:

STEP 4. Common practice analysis

'The geographical region for analysis is limited to the Indian Sundarbans covering the Sundarban Biosphere Reserve (4,260 sq km protected area comprising the core and buffer zone) as well as the 5,400 sq km of transition area including non-forest, inhabited region of the Sundarbans along the north and north-western fringe of mangrove forest. Hence, the total area of Sundarban region in India is 9,600 sq km. Mangrove restoration activities undertaken by Livelihoods and NEWS are implemented in the 5,400 sq km transition area outside of the Sundarban Biosphere Reserve, see map below where NEWS project areas are marked in red, the second map shows the boundary of the Biosphere Reserve (core Zone in light yellow, buffer zone in pink).

Looking at past or ongoing restoration activities, most efforts by the local government (Forest Department of West Bengal) are concentrated only within the area of the Biosphere Reserve. Based on Vyas and Sengupta (2012) a total of 17,000 ha of mangrove plantations have been established within the Biosphere Reserve since its declaration in 1989 which represents around 785 ha per year. This is also reported in the most recent World Bank Strategy Report (2014) for the Sundarbans stating that between 1990 and 2010; more than 15,200 ha of mangrove were documented as planted. However, the same report indicates that approximately 50 percent of these plantations have been lost due to natural and anthropogenic causes.

Within the transition zone outside of the Biosphere Reserve where this NEWS project is being implemented the project activity is the "first of its kind" especially considering the community involvement and participation approach during establishment, management, protection and monitoring. This is in contrast to the efforts undertaken by the Forest Department where plantations are established, guarded and monitored by the Forest Department staff and where mangrove plantations are not maintained after the first two years (Vyas and Sengupta 2012).

The due diligence study for this project in 2010, which was led by a team with extensive familiarity and experience with mangrove systems generally and the Sundarbans area specifically concluded for the transition zone of the Sundarbans that 'West Bengal Forest Department historically plants about 150 ha annually in monocrop *Avicennia*. World Bank has provided financing under a national Integrated Coastal Zone Management (ICZM) project for mangrove restoration in West Bengal but it will occur only in Sagar District in the Sundarbans, as well as in the Digha town area falling outside of the Sundarbans. West Bengal Irrigation Department is currently working on 1000 km of embankment repairs and reconstruction and has indicated mangrove bioshields of 50–200 m in its design drawings but no explicit budgetary resources have been made available to plant such bioshields. In summary, current and anticipated planting efforts in the absence of this project are estimated to be less than 200 ha annually'.

As outlined above in the barrier analysis, one of the most important barriers is the knowledge and capacity to successfully establish and maintain site-adapted plantations which will sustain and will grow into mature mangrove forests. In fact, some of these earlier plantation efforts have been taken into the project area as degraded 'dwarf' mangroves which will be restored as part of the NEWS project.

Auditor Response: The audit team checked the revised PD and confirmed that it has been revised

including the following changes:

a) The institutional barrier argued by the project proponent has been changed to a social barrier, which is in line with paragraph 13 of the combined tool. Therefore, the issue has been resolved and the finding may be closed.

b) & c) The common practice analysis has been revised, following the three-step procedure defined by the combined tool. The geographical region of the analysis has been reduced to the Indian Sundarbans covering the Sundarban Biosphere Reserve (4,260 sq km protected area comprising the core and buffer zone) as well as the 5,400 sq km of transition area including non-forest, inhabited region of the Sundarbans along the north and north-western fringe of mangrove forest. This geographical region is reasonable as it is all included in the same state within India and it is subject to the same laws, regulations, social and natural conditions. Within this region, it is confirmed through third party evidence that since 1990 an average of 785 ha/year have been established, yet most of these have been established within the boundary of the Sundarban Biosphere Reserve, which is not comparable to the project area as the former is government land under control of the forest department. Moreover, it is indicated that more than 50% of the established plantations have died as a result of anthropogenic or natural factors. In view of this, a due diligence conducted by the project proponent found that the total reforestation rate out of the Biosphere Reserve would be around 200 ha/year, significantly lower than the project rate. As confirmed during the site visit, most of these plantations have a very high mortality and the success rate is low in comparison to the project's rate. In view of this, the audit team is able to confirm that the project is not a common practice so this issue has been resolved and the finding may be closed.

Closing Remarks: The Client's response adequately addresses the finding.

NCR 2015.9 dated 04/28/2015

Standard Reference: VCS Project Description Template, Version 3.2, Section 4.1.

Document Reference: 2015-02-11 Project Description NEWS

Finding: According to the VCS PD Template, Section 4.1, "data and parameters that are determined or available at validation, and remain fixed throughout the project crediting period" must be reported in the provided tables. The audit team checked the PD and found that the following parameters, which remain fixed throughout the project crediting period, have not been provided:

a) DF_DW;

Client Response: The parameter DF_DW has been included in the section 4.1

Auditor Response: The audit team checked the revised PD and confirmed that Section 4.1 now includes parameter DF_DW. Therefore, Section 4.1 is now in compliance with the project description template and this finding may be closed.

Closing Remarks: The Client's response adequately addresses the finding.

NCR 2015.10 dated 04/28/2015

Standard Reference: VCS Project Description Template, Version 3.2, Section 4.1.

Document Reference: 2015-02-11 Project Description NEWS

Finding: According to the VCS PD Template, Section 4.2, "data and parameters that will be monitored during the project crediting period" must be reported in the provided tables. The audit team checked the PD and found the following issues:

a) The PD states under parameter "APLOT" that "A circular plot design ($r = 11\text{m}$) is chosen" which is not accurate or consistent with what is actually being used, i.e. a diameter of 2 or 3 m.

Client Response: This type error is already corrected

Auditor Response: The audit team checked the revised PD and confirmed that under APLOT there is no longer reference to a radius of 11 metres. The radius is of 2-3 metres as confirmed by the audit team during the site visit. Therefore, this finding has been resolved and may be closed.

Closing Remarks: The Client's response adequately addresses the finding.

NCR 2015.11 dated 06/02/2015

Standard Reference: VCS Project Description Template, Version 3.2, Section 1.12.2

Document Reference: 2015-05-15 Project Description NEWS

Finding: The VCS Project Description Template requires that Sec. 1.12.2 "Indicate whether the project reduces GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading..." Sec. 1.12.2 of the PD does not contain the specific indication that is required.

Client Response: Section 1.12.2 has been revised to: As a developing nation, the country of India has no binding limits on GHG emissions or compliance requirements under international multilateral agreements. GHG removals generated by this project will not be used for compliance with binding limits to GHG emissions since such limits are not enforced in India. There are no emissions trading programs in place in the country. Consequently, this project will only generate net GHG emission reductions on an additional and voluntary basis.

Auditor Response: The audit team checked the revised PD and confirmed that Section 1.12.2 has been revised. The relevant section states that there is no emission trading program in the country or any other mechanism that included GHG allowance trading. This is confirmed by the auditor through its local knowledge on the Indian carbon regulations. Therefore, the finding has been resolved and it may be closed.

Closing Remarks: The Client's response adequately addresses the finding.

NCR 2015.12 dated 06/02/2015

Standard Reference: VCS Standard, Version 3.4, Section 3.4.9; VCS Project Description Template, Version 3.2, Section 1.13

Document Reference: 2015-05-15 Project Description NEWS

Finding: According to the VCS Standard, Section 3.4.9, grouped projects shall include one or more sets of eligibility criteria for the inclusion of new project activity instances, and these criteria shall ensure that the new project activity instances comply with a set of requirements listed in Section 3.4.9. These criteria must be self-contained and do not rely upon other sections of the project description or other documents. The audit team checked the PD and found that the eligibility criteria refer to other sections of the PD and the applicable methodology, therefore not being self-contained. Please provide eligibility criteria formulated in accordance to the VCS rules.

Client Response: The first part of PD section 1.13 has been revised

Auditor Response: The audit team checked the revised PD and confirmed that the eligibility conditions were changed. However, condition 3) is still not inclusive and refers to Section 2.4 of the PD. Therefore, this issue has not been resolved.

Client Response 2: Condition 3) has been revised to: 3) Be subject to the baseline scenario of this Project Description for the specified project activity and geographic area, and therefore be established on lands where baseline scenario is degraded wetlands. The whole geographic project area within which the project instances shall be located is subject to the baseline scenario determined in this project description. All project instances as well future instances are classified as mudflats - shoals that are simply salt marches with no or some existing shrubby biomass vegetation with patches of degraded mangrove trees. Due to the high population densities, and the high dependency on fishing and prawn seed collection (as much as 50% of the local population) within the creeks and channels of the inhabited areas the pressures on the "free" natural resource base are exacerbated.

Auditor Response 2: The audit team checked the revised PD and confirmed that the eligibility conditions were changed. Conditions are now in accordance to the VCS rules as they are inclusive. Therefore, this finding has been resolved and may be closed.

Closing Remarks: The Client's response adequately addresses the finding.

