VALIDATION ASSESSMENT REPORT

Promotion of climate smart agriculture practices for sustainable rice cultivation in Ghana



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Mitigation Activity Name	Promotion of climate smart agriculture practices for sustainable rice cultivation in Ghana
Client	United Nations Development Programme (UNDP)
Name, position, and signature of the approver of the validation report	Jose Luis Fuentes Climate Change Manager jfuentes@aenor.com
Version number	1.0
Date of issue	26-April-2022
Estimated Emission Reduction	1,344,592 tCO ₂ e
Crediting period	01-June-2022 to 31-December-2030



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SECTION A. Executive summary

AENOR has carried out the validation of the Mitigation Activity (MA) programme *Promotion of climate smart agriculture practices for sustainable rice cultivation in Ghana* under the Article 6.2 of the Paris Agreement for Internationally Transferred Mitigation Outcomes (ITMO). The programme is an Alternate Wetting and Drying (AWD) for rice cultivation MA to be implemented across Ghana (sectoral scope 15. Agriculture). The MA aims to provide AWD technical training to rice farmers, leading to significant methane emission reductions and increased yield, cut water pumping costs and improved efficiency of water use. The programme expects to lead to the adoption AWD technology covering 78% per cent of Ghana's rice production areas and train 11,000 farmers on AWD.

The programme start date is 1 June 2022. The crediting period is from 1 June 2022 to 31 December 2030, 8 years and 7 months (8.58 years). The estimated ex-ante net GHG emissions reductions at validation for the 8.58-year programme span are 1,344,592 tCO₂e, at an average of 156,712 tCO₂e/year.

The purpose of the validation was to determine the conformance of the MA programme with respect to the principles and criteria set by Article 6.2 of the Paris Agreement, the Cooperation Agreement between the Swiss Confederation and the Republic of Ghana towards the implementation of the Paris Agreement, Ghana's Nationally Determined Contribution (NDC), and the GHG calculation methodology (CDM AMS-III. AU Methane emission reduction by adjusted water management practice in rice cultivation v04.0). The process was performed through a combination of desk review and communications with relevant personnel. The scope was defined as follows: programme boundaries and activities; its baseline scenario and additionality; ex-ante estimation of GHG emission reductions, monitoring plan, and sustainable development contributions.

During the validation, 6 corrective action requests (CARs) and 13 clarification requests (CLs) were raised. All these issues were duly closed through corrections, clearer explanations and provision of additional supporting evidence.

Once all issued detected were appropriate resolved, AENOR carried out this final validation report and deems with reasonable level of assurance that the MA programme complies with all the validation criteria. The audit team has no restrictions or uncertainties with respect to the compliance of the programme with the validation criteria. Hence, the audit team concludes that the programme complies with all the principles set by Article 6.2 of the Paris Agreement. The cumulative estimated ex-ante net GHG emissions reductions or removals of 1,344,592 tCO₂e over the crediting period (01-June-2022 to 31-December-2030) and the average of 156,712 tCO₂e/year have been quantified in accordance with the CDM methodology AMS-III. AU Methane emission reduction by adjusted water management practice in rice cultivation v04.0, and, based on the assumptions used by the MA programme proponent (PP), are accurate and free of material error.

SECTION B. Validation method and criteria

B.1. Scope and criteria of the validation

The purpose of the validation audit activity was to conduct an independent assessment of the MA programme in order to determine whether the programme complies with the validation criteria as set out in the guidance documents listed below, including the monitoring procedures, and that the GHG emission reductions estimated ex-ante in the Mitigation Activity Design Document (MADD) are materially accurate.

The scope of the validation audit was to validate the design and emissions reductions of the proposed MA in Ghana against the principles of Article 6.2 of the Paris Agreement, the identified methodology and associated tools.

The scope was defined as follows:

- Programme activities.
- Programme boundaries.



- Additionality.
- Baseline scenario.
- Ex-ante estimation of GHG emission reductions.
- Double counting.
- Monitoring plan.
- Sustainable development contributions.

The validation was performed against the criteria set by the following documents:

- Article 6.2 of the Paris Agreement.
- Cooperation Agreement between the Swiss Confederation and the Republic of Ghana towards the implementation of the Paris Agreement.
- Ghana's Updated Nationally Determined Contribution under the Paris Agreement (2020-2030), November 2021.
- CDM AMS-III.AU Small-scale Methodology: Methane emission reduction by adjusted water management practice in rice cultivation, Version 04.0.

The assessment was conducted to provide a reasonable level of assurance of conformance against the defined validation criteria and materiality thresholds within the audit scope. The materiality thresholds were considered as follows:

- **Quantitative**: Any error, omission, and/or misrepresentation relative to the total reported GHG emission and removals or emissions reductions.
- Qualitative: Any issues related to poorly managed data or documentation, any non-compliance with
 the applicable validation criteria applicable criteria; and any error in reporting of factual information in
 the MADD.

B.2. Validation process

The validation was performed through a combination of document review and interviews with relevant personnel. At all times, the programme was assessed for conformance to the criteria described in section B.1of this report. Findings were issued to ensure that the programme was in full conformance to all requirements.

A programme specific Validation and Sampling Plan was developed to guide the validation auditing process to ensure efficiency and effectiveness. The purpose of the Validation and Sampling Plan was to present a risk assessment for determining the nature and extent of validation procedures necessary to ensure the risk of auditing error was reduced to a reasonable level. The Validation & Sampling Plan methodology was derived from all items in our validation process stated above. Specifically, the sampling plan utilized the guidance of ISO 14064-3:2019 "Greenhouse Gases. Part 3: Specification with guidance for validation and verification on gases". Any modifications applied to the Validation and Sampling plan were made based upon the conditions observed for monitoring in order to detect the processes with highest risk of material discrepancy.

A detailed review of all programme documentation was conducted to ensure consistency with and identify any deviation from the validation criteria, including the methodology (CDM AMS-III.AU v04.0). For a list of all documents received from the client and assessed for this validation, see Appendix 1.

AENOR carried out a deep and meticulous review of the spreadsheet /3/ in order to verify the correct application of the methodology (formulae, equations) and checked that data required calculating the GHG reductions were appropriately provided in the MADD. Based on the assessment carried out, AENOR confirms with a reasonable level of assurance that the claimed ex-ante emission reductions are free from material errors, omissions, or misstatements.

AENOR confirms that sufficient evidence was presented for the ex-ante estimated net anthropogenic GHG emission reductions and that there is a clear audit trail that contains the evidence and records that validate the stated figure in this validation report since:



- Sufficient evidence available: the PP has provided 100% of data used in the calculations to achieve the final estimated amount of GHG emission reductions.
- Nature of evidence: the raw data were collected from reliable sources. They are detailed in the programme documents and have been provided to the validation team and were checked during the interviews.
- Cross-checked evidence: AENOR cross-checked the collected information through interviews reproducing calculations.

Hence, AENOR confirms that the stated figures in the MADD are correct and confirms that is able to certify the ex-ante net anthropogenic GHG reductions based on verifiable and reliable evidence.

Several validation findings were raised in the form of CLs, CARs and OBS and submitted to the PP, which addressed them either by providing to the audit team with the requested information or by making the appropriate corrections. Updated versions of the documentation were submitted by the PP and the audit team reassessed them against the validation criteria. This process was repeated iteratively until all findings were fully closed. Specifically, 6 CARs, 13 CLs and 1 OBS were raised. All findings issued during the validation process and the inputs for their closure are described in Appendix 2 of this report.

There are no pending issues for the first verification. No forward action request (FAR) has been raised during the validation.

B.3. Internal quality control

Following the completion of the assessment process by the validation team, all documentation underwent an internal quality control through a technical review before submission to the client. The technical reviewer is a qualified member of AENOR, independent from the team that carried out the validation of the MA programme. The technical reviewer appointed for the technical review is qualified in the technical area and sectoral scope of the MA.

B.4. Validation team members

Role	Last name			Interviews	Validation findings
Lead Auditor	Gómez	Juan Carlos	Х	Х	Х
Auditor	Cócera	Javier	Х	Х	Х

B.5. Technical reviewer and approver of the validation and certification report

No.	Role	Last name	First name
1.	Technical reviewer & Approver	Fuentes	Jose Luis



B.6. Interviews

No.	Interviewee				
	Last name	First name	Affiliation		
1	Soezer	Alexandra	Carbon Technical Advisor, UNDP		
2	Kansuk	Stephen Team Leader & Environment and Climate Cha Specialist, UNDP Ghana			
3	Fernández	Luz	Project Coordinator, UNDP		
4	Tutu	Daniel	Deputy Director, Ghana Environmental Protection Agency		

SECTION C. Validation findings

C.1. Mitigation activity details

The MA *Promotion of climate smart agriculture practices for sustainable rice cultivation in Ghana* is an Agricultural (sectoral scope 15) AWD for rice cultivation programme. The ITMO programme will provide training to farmers to replace continuous flooding over the cropping season with AWD techniques. This will lead to significant methane emission reductions, increased yield, cut water pumping costs and improved efficiency of water use. The programme expects to lead to the adoption AWD technology covering 78% per cent of Ghana's rice production areas and train 11,000 farmers on AWD.

The MA proponent is the United Nations Development Programme (UNDP). The owner of the mitigation activity is the Ghana Ministry of Environment. The Environmental Protection Agency (EPA) under the Ministry of Environment is responsible for the coordination of programme in Ghana and for ITMO reporting to the United Nations Framework Convention on Climate Change (UNFCCC). UNDP will oversee the day-to-day management of the ITMO programme. The Ministry of Food and Agriculture (MOFA) and the Ghana CSIR-Crops Research Institute (CCSIR-CRI) will facilitate the adoption and training of AWD practices and the execution of MRV practices.

The programme start date is 1 June 2022. The crediting period is from 1 June 2022 to 31 December 2030, 8 years and 7 months (8.58 years). The estimated ex-ante net GHG emissions reductions at validation for the 8.58-year programme span are 1,344,592 tCO2e, at an average of 156,712 tCO2e/yr.

The programme will be implemented in the seven major rice producing regions of Ghana: i) service areas of Greater Accra, ii) Volta region, iii) Central region, iv) Ashanti region, v) Northern region, vi) Upper East region, and vii) Upper West region. The programme aims to implement AWD techniques in a total of 244,600 ha during the crediting period.

C.2. Compliance of the mitigation activity with the methodology

The programme uses the CDM small-scale methodology AMS-III.AU *Methane emission reduction by adjusted* water management practice in rice cultivation v04.0. The following table summarizes the applicability conditions of the methodology and the compliance assessment carried out by the audit team:

	Applicability condition	Assessment
(a)	Rice cultivation in the project area is predominantly characterized by irrigated, flooded fields for an extended period of time during the growing season, i.e. farms	data, that programme area is predominantly



	Applicability condition	Assessment
	whose water regimes can be classified as upland or rainfed and deep water are not eligible to apply this methodology. This shall be shown from a representative survey conducted in the geographical region of the proposed project or by using national data. This project area characterization shall also include information on pre-season water regime and applied organic amendments, so that all dynamic parameters as shown in Table 2 are covered by the baseline study.	, , , , , , , , , , , , , , , , , , , ,
(b)	The project rice fields are equipped with controlled irrigation and drainage facilities such that both during dry and wet season, appropriate dry/flooded conditions can be established on the fields.	installation of perforated 10 cm x 25 cm PVC
(c)	The project activity does not lead to a decrease in rice yield. Likewise, it does not require the farm to switch to a cultivar that has not been grown before.	· · · · · · · · · · · · · · · · · · ·
(d)	Training and technical support during the cropping season that delivers appropriate knowledge in field preparation, irrigation, drainage and use of fertilizer to the farmer is part of the project activity and is to be documented in a verifiable manner (e.g. protocol of trainings, documentation of on-site visits). In particular the project proponent is able to ensure that the farmer by himself or through experienced assistance is able to determine the crop's supplemental N fertilization need. The applied method shall assess the fertiliser needs using for example a leaf colour chart or photo sensor or testing stripes. Alternatively a procedure to ensure efficient fertilization considering the specific cultivation conditions in the project area backed by scientific literature or official recommendations shall be used.	which demonstrates that farmers will be trained on how to determine the crop's
(e)	Project proponents shall assure that the introduced cultivation practice, including the specific cultivation elements, technologies and use of crop protection products, is not subject to any local regulatory restrictions	the programme techniques and practices. The programme is developed and
(f)	Except the case where the default value approach indicated in section 5.8.2 "Emission reductions using IPCC tier 1 approach or default values" is chosen for emission reductions calculations, project proponents have access to infrastructure to measure CH4 emissions	' -



	Applicability condition	Assessment
	from reference fields using closed chamber method and laboratory analysis.	
(g)	Aggregated annual emission reductions of all fields included under one project activity shall be less than or equal to 60 kt CO ₂ equivalent.	

AENOR, based on records provided, verified the applicability conditions of the methodology. The audit team deems that the PP has selected the most appropriate existing methodology.

The programme boundary, as per the methodology, encompasses the rice fields where the cultivation method and water regime are changed. The programme will be implemented in the seven major rice producing regions of Ghana: i) service areas of Greater Accra, ii) Volta region, iii) Central region, iv) Ashanti region, v) Northern region, vi) Upper East region, and vii) Upper West region. A total of 244,600 ha is assumed to be implementing AWD practices during the crediting period. The only GHG source considered is CH₄ emissions from anaerobic decomposition of organic matter in rice cropping soils. No carbon pools are included. AENOR deems that the programme boundary is correctly defined and in compliance with the applicable methodology.

C.3. Baseline scenario

As per the methodology, the PP has considered as the baseline the continuation of the current practice, i.e., the continuous flooding of rice fields up to two weeks before harvest. Based on the evidence provided, the audit team considers that this is the most common cultivation rice practice in Ghana currently and, thus, the baseline scenario identified complies with CDM methodology AMS-III v04.0.

C.4. Additionality

According to the PP, the ITMO programme is not included in the conditional or in the unconditional NDC of Ghana. Therefore, it is not part of the NDC baseline and, thus, the ITMO programme is additional to Ghana's NDC. Reducing methane emissions from the continuous flooded rice is only possible through the cooperative approaches under Article 6.2 of the Paris Agreement.

The audit team reviewed Ghana's NDC and verified that the sectoral scope of the programme is not included. The additionality consideration is in accordance with *Ghana's Framework for Cooperative Approach under Article 6.2 of the Paris Agreement /9/.* Thus, AENOR deems that the additionality of the programme is appropriately justified and in accordance with the validation criteria.

C.5. Quantification of GHG emission reductions and removals

Procedures for quantifying the GHG emission reductions generated by the programme during the crediting period were conducted in accordance with the CDM methodology AMS-III v04.0. The validation team performed an intensive review of all input data, parameters, formulas, calculations, conversions, statistics and resulting output data to ensure consistency with the validation criteria.



Furthermore, the validation team reproduced 100% of the calculations to ensure accuracy of the results. Conversion factors, formulas, and calculations were provided by the PP in spreadsheet format /3/ to ensure all formulas were accessible for review.

The PP estimated the ex-ante emission reductions using IPCC tier 1 approach Option 1, as per section 5.8.2 of the methodology.

Baseline emissions

The cultivation pattern considered for the baseline scenario was the following:

Nr.	Parameter	Туре	Values/Categories	Source
1	Water regime on-season	Dynamic	Continuously flooded Single Drainage	MOFA
2	Water regime pre-season	Dynamic	Flooded Short drainage	MOFA
3	Organic Amendment	Static	No organic amendments	MOFA
4	Number of cropping seasons	Static	2 (two)	MOFA
5	Cultivation period of rice per year in days	Static	135	MOFA

Baseline emissions were estimated applying the equation:

$$BE_y = EF_{BL} \times A_y \times L_y \times 10^{-3} \times GWP_{CH_4}$$

Where:

 BE_v = Baseline emissions in year y (tCO₂e).

 EF_{BL} = Baseline emission factor (kgCH₄/ha/day).

 A_{y} = Area of project fields in year y (ha).

 L_v = Cultivation period of rice in year y (days/year).

 GWP_{CH_4} = Global warming potential of CH₄ (tCO₂e/tCH₄).

 EF_{BL} was estimated using equation 9 of the methodology:

$$EF_{BL} = EF_{BL,c} \times SF_{BL,w} \times SF_{BL,p} \times SF_{BL,o}$$

The following table summarizes the parameters and assumptions used by the PP for the estimation of the baseline emissions and the assessment of the audit team:

Parameter	Value	Assessment procedure
$EF_{BL,c}$	1.19	Value verified with original source: IPCC 2006 Vol. 4 Ch. 5. Correctly inputted in spreadsheet /3/.
$SF_{BL,w}$	1.00	Default value of methodology for baseline in regions/countries where double cropping is practice. Correctly inputted in spreadsheet /3/.



Parameter	Value		Assessment procedure
$SF_{BL,p}$	1.00		Default value of methodology for baseline in regions/countries where double cropping is practice. Correctly inputted in spreadsheet /3/.
$SF_{BL,o}$	2	.88	Default value of methodology for baseline in regions/countries where double cropping is practice. Correctly inputted in spreadsheet /3/.
EF_{BL}	3	.43	Calculation reproduced and verified in spreadsheet /3/.
A_y	Year	Ay	Assumption of PP. Correctly inputted in spreadsheet /3/.
	2022	28,800	
	2023 28,800 2024 32,000 2025 32,000 2026 41,000		
	2027	20,000	
	2028	20,000	
	2029 20,000		
	2030	20,000	
L_y	135		Value verified with MOFA. Correctly inputted in spreadsheet /3/.
GWP_{CH_4}	25		Value verified with original source: AR4. Required by Ghana's NDC. Correctly inputted in spreadsheet /3/.

Project emissions

The PP assumed the following cultivation pattern in the project scenario:

Nr.	Parameter	Туре	Values/Categories	Source
1	Water regime on-season	Dynamic	Intermittent flooded conditions (multiple aeration)	Assumption
2	Water regime pre-season	Dynamic	Intermittent flooded conditions (multiple aeration)	Assumption
3	Organic Amendment	Static	No organic amendments	MOFA
4	Number of cropping seasons	Static	2 (two)	MOFA



5	Cultivation period of rice per year in	Static	135	MOFA	ĺ
	days				

Project emissions were estimated using the following equation:

$$PE_{\nu} = EF_P \times A_{\nu} \times L_{\nu} \times 10^{-3} \times GWP_{CH_A}$$

Where:

 PE_y = Project emissions in year y (tCO₂e).

 EF_P = Project emission factor (kgCH₄/ha/day).

 A_{ν} = Area of project fields in year y (ha).

 L_v = Cultivation period of rice in year y (days/year).

 GWP_{CH_A} = Global warming potential of CH₄ (tCO₂e/tCH₄).

 EF_P was estimated using equation 8 of the methodology:

$$EF_P = EF_{BL,c} \times SF_{P,w} \times SF_{P,p} \times SF_{P,o}$$

The following table summarizes the parameters and assumptions, that differ from the baseline scenario, used by the PP for the ex-ante estimation of the programme emissions and the assessment of the audit team:

Parameter	Value	Assessment procedure
$SF_{P,W}$	0.52	Default values of methodology for project in regions/countries where double cropping is practice, change the water regime from continuously to intermittent flooded conditions (multiple aeration). Correctly inputted in spreadsheet /3/.
$1 N F_n = 1 100 1$		Default value of methodology for baseline in regions/countries where double cropping is practice. Correctly inputted in spreadsheet /3/.
$1 \lambda F_n \lambda 88 $		Default value of methodology for regions/countries where double cropping is practice. Correctly inputted in spreadsheet /3/.
EF_P 1.79 Calculation reproduced and verified in s		Calculation reproduced and verified in spreadsheet /3/.

Leakage emissions

As per methodology AMS-III.AU v04.0, any effects of the project activity on GHG emissions outside the project boundary are deemed to be negligible.

Emission reduction

The estimated ex-ante net GHG emission reduction to be achieved by the programme during the crediting period was estimated using the following equation:

$$ER_{\nu} = BE_{\nu} - PE_{\nu}$$

Where:

 ER_v = Emission reductions in year y (tCO₂e).

 BE_{ν} = Baseline emissions in year y (tCO₂e).



 PE_v = Project emissions in year y (tCO₂e).

The result achieved by the PP are summarized in the following table:

Year	Estimated baseline emissions (tCO ₂ e)	Estimated project emissions (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions (tCO ₂ e)
2022	333,124	173,502	0	159,622
2023	333,124	173,502	0	159,622
2024	370,138	192,780	0	177,358
2025	370,138	192,780	0	177,358
2026	474,239	246,999	0	227,239
2027	231,336	120,488	0	110,849
2028	231,336	120,488	0	110,849
2029	231,336	120,488	0	110,849
2030	231,336	120,488	0	110,849
Total	2,806,106	1,461,513	0	1,344,592

AENOR reproduced calculations in the spreadsheets /3/ to achieve the same results and deems they are depicted clearly and correctly in the provided sheets. AENOR validation team was able to trace parameters directly from their original sources and found no material error. Formulae used are in compliance with the methodology.

Based on the information reviewed, it can also be confirmed that the sources used are correctly quoted and interpreted in the MADD and supporting documents. All assumptions and data indicated in the MADD and all relevant sources were checked and confirmed and are listed in the MADD, including their references and sources.

In essence, the methodology was correctly applied following the requirements. All values in the MADD are considered reasonable in the context of the proposed ITMO programme. Data sources are quoted correctly. Hence, the calculation of baseline and project emission and the estimated net GHG emission reductions are considered correct.

C.6. Double counting

According to the PP, double counting is avoided through the commitment of the Ghana Government to apply a corresponding adjustment to all ITMO programmes and projects implemented under the bilateral agreement with Switzerland. The corresponding adjustment ensures that the MO are not claimed twice.

Specifically, the eligibility criteria under *Ghana's Framework for Cooperative Approach under Article 6.2 of the Paris Agreement* /9/ include provisions to prevent the registration of MA under more than one national or international carbon crediting scheme, whether voluntary or otherwise, to avoid double counting. In addition, MA shall demonstrate at verification that there is no double counting nor double claiming.

The audit teams deems that this is aligned with the Cooperation Agreement between the Swiss Confederation and the Republic of Ghana towards the Implementation of the Paris Agreement /8/. AENOR did not found any evidence of potential double counting during the validation.



C.7. Monitoring plan

The audit team checked all parameters presented in the monitoring plan within the MADD against the requirements of the methodology AMS-III.AU *Small-scale Methodology: Methane emission reduction by adjusted water management practice in rice cultivation*, v04.0 (section 6) and found that they are appropriate.

The parameters fixed at validation are:

- EF_{BL.s.a} Baseline emission factor, 3.43 kgCH₄/ha/day.
- *EF_{P,s,g}* Baseline emission factor, 1.79 kgCH₄/ha/day.

The list of parameters to be monitored is the following:

- As, g Aggregated project area in season s.
- Ly Cultivation period of rice in year y.

In opinion of AENOR, all necessary parameters required by the selected methodology are contained in the monitoring plan and are clearly described. The means of monitoring described in the plan comply with the requirements of the methodology.

In essence the monitoring plan presented in the MADD under the section *Monitoring & Reporting* and the associated reporting sheets /4/ comply with the requirement of the methodology. The audit team deems that the ITMO associated with the implementation of programme are planned to be monitored through a transparent structure.

After the review of evidence provided by the PP the interview, and communications with PP, AENOR confirms that monitoring arrangements described in the monitoring plan are feasible within the programme design and that the means considered for the implementation, including data management, quality and assurance control procedures, are sufficient to ensure that the GHG net anthropogenic reductions achieved resulting from the proposed MA can be reported ex post and verified. Therefore, in opinion AENOR, the PP will be able to implement the monitoring plan.

C.8. Sustainable development

Section 4 of the MADD describes the expected impact of the programme in promoting sustainable development. Specifically, the programme is expected to contribute to 10 UN's Sustainable Development Goals (SDGs):

- SDG1 No poverty
- SDG2 Zero hunger
- SDG4 Good health and well-being
- SDG5 Gender equality
- SDG6 Clean water and sanitation
- SDG8 Decent work and economic growth
- SDG9 Industry, innovation, and infrastructure
- SDG13 Climate action
- SDG15 Life on land
- SDG17 Partnership for the goals

The programme will undergo a UNDP's SDG Impact Assessment through the Climate Action Impact Tool (CAIT). Additionally, the contribution to 3 SDGs will be monitored during the crediting period:

- **SDG4**: Contribute to inclusive and equitable education by providing targeted trainings to farmers (number of female famers).
- **SDG5**: Help advance on gender equality by ensuring a minimum participation of female farmers in the trainings (% of female farmers).
- SDG6: Application of AWD improves sustainable water management (ha per cropping season).



The audit team traced the identification of the programme impacts on sustainable development through the causal relations described by the PP and assessed their rationale based on the defined conditions prior to the programme start (sustainable development baseline), on the nature of the programme activities and their goals, on the evidence provided and on the own experience of the auditor. AENOR is able to confirm that the impacts have been comprehensible identified and that the expected contribution to SDG is appropriately attributed.

SECTION D. Validation conclusions

AENOR has validated that the Mitigation Activity Programme *Promotion of climate smart agriculture practices* for sustainable rice cultivation in Ghana is in compliance with the principles of the Article 6.2 of the Paris Agreement without qualifications or limitations.

AENOR has performed the validation of this AWD rice cultivation programme in Ghana on the basis of the validation criteria set by Article 6.2 of the Paris Agreement, the Cooperation Agreement between the Swiss Confederation and the Republic of Ghana towards the implementation of the Paris Agreement, Ghana's NDC, and the GHG calculation methodology. The conclusions of this report showed that the programme, as it was described in the Mitigation Activity Design Document, is in line with all criteria applicable for the validation.

The validation consisted of the following three phases: i) a desk review of the programme design; ii) follow-up interviews with programme staff; iii) the resolution of outstanding issues and the issuance of the final Validation Report and opinion. During the validation process, corrective actions and clarifications were raised. All have been successfully closed as explained in the validation protocol annexed to this report (Appendix 2).

The CDM AMS-III.AU *Small-scale Methodology: Methane emission reduction by adjusted water management practice in rice cultivation*, Version 04.0 was applied to determine the GHG net anthropogenic reductions. The GHG net anthropogenic reductions attributable to the programme are additional to any that would occur in the absence of the mitigation activity.

The review of the Mitigation Activity Design Document and additional documents related to baseline and monitoring methodology, and the subsequent background investigation, follow-up interviews and review of comments by parties have provided AENOR with sufficient evidence to validate the fulfilment of the stated criteria.

In detail, the conclusions can be summarized as follows:

- The programme is in line with all validation criteria.
- The programme additionality is sufficiently justified in the Mitigation Activity Design Document.
- The monitoring plan is transparent and adequate.
- The analysis of the baseline emission, project emissions and leakage has been carried out in a transparent and conservative manner.
- The programme start date is 01–June–2022 and will have a crediting period of 8 years and 7 months, until 31–December–2030. During this period, the reduction of 1,344,592 tCO₂e is expected through the implementation of programme activities, accounting for an annual average of 156,712 tCO₂e//year.
- The programme has demonstrated that all claims related to its expected contribution to the SDGs are credible and achievable.

AENOR confirms with a reasonable level of certainty that the Mitigation Activity Design Document and the claimed emission reductions are free from material errors, omissions, or inaccuracies.

Madrid, 26 April 2022.

Juan Carlos Gómez Lead auditor Approved by

Jose Luis Fuente

Climate Change Unit Manager



Appendix 1. Documents reviewed or referenced

No.	Title	Date of reception/ retrieval
1	MADD Ghana – Alternative Wetting and Drying for Rice Cultivation, dated 7 th April 2022	21/04/2022
2	Project Summary	17/03/2022
3	Ghana_Emission Reduction Calculations_default values.xlsx	03/04/2022
4	Ghana_Rice Monitoring Sheets.xlsx	03/04/2022
5	Ghana_Rice Project project budget.xlsx	17/03/2022
6	Climate Smart Agriculture Training Manual	07/04/2022
7	Tentative agenda for visits to office and schemes under Ghana Irrigation Development Authority (GIDA) – Team A & Team B	03/04/2022
8	Cooperation Agreement between the Swiss Confederation and the Republic of Ghana towards the Implementation of the Paris Agreement	17/03/2022
9	Ghana's Framework for Cooperative Approach under Article 6.2 of the Paris Agreement	17/03/2022



Appendix 2. Findings

Corrective Action Requests (CARs)

CAR ID 01 Date: 01/04/2022

Description of CAR

The figure of Total number of ITMOs for transfer reported in the front page of the MADD does not match with the figure reported in the rest of the document and the spreadsheet *Ghana_Emission Reduction Calculations default values.xlsx*.

Date: 01/04/2022

Programme Proponent response

The total figure has been rounded up as maximum possible ITMO purchasing volume from this ITMO programme under the financing agreement between Switzerland and UNDP. The remaining cumulative 44,592 tonnes would be available insurance buffer or corrections as may be required by the national regulations.

Documentation provided by the Programme Proponent

Article 6.2 framework proposed unit buffer as one of the strategies for avoiding overselling.

VVB Assessment Date: 04/04/2022

The PP has provided adequate clarification.

CAR closed

CAR ID 02 Date: 01/04/2022

Description of CAR

According to paragraph 2.8.2.2 of the *Ghana's Framework for Cooperative Approach under Article 6.2 of the Paris Agreement,* Unedited v1, all eligible MO activities outside the pre-selected list (Schedule 4) must demonstrate additionality to NDC baselines.

However, no demonstration of additionality is provided in the MADD.

Programme Proponent response Date: 01/04/2022

Since the ITMO programme is neither included in the conditional nor in the unconditional NDC, and therefore not considered in the NDC baseline, the ITMO programme is additional to Ghana's NDC and reducing methane emissions from the continuous flooded rice is only possible through the cooperative approaches under Article 6.2 of the Paris Agreement. The baseline scenario is therefore the "continuation of the current practice e.g. transplanted and continuously flooded rice cultivation" in the target area. The emissions associated with the current practice account for 8.5% of the total Agric sector methane emissions of 4.2 million tonnes. The 2019 rice emissions of 0.36 million tonnes has increased by 77% since 2010 and expected to increase by 92% by 2030 along the BAU pathway.



Documentation provided by the Programme Proponent

Ghana's Fourth National Greenhouse Gas Inventory Report, 2022

VVB Assessment Date: 04/04/2022

The PP has provided clarification and has made the adequate additions to the MADD regarding additionality to the NDC.

CAR closed.

CAR ID 03 Date: 01/04/2022

Description of CAR

Paragraph 8 of CDM methodology AMS-III.AU v04.0 requires: "For the purpose of defining reference field conditions for baseline and project emission measurements and their comparison with project fields, classify each project field with its specific pattern of cultivation conditions, applying the following parameters under Table 2."

However, project cultivation patterns of project fields are not assessed and classified as per parameters of Table 2 of the methodology.

Date: 01/04/2022

Date: 04/04/2022

Programme Proponent response

As an alternative to the reference field approach, the methodology allows project participants to calculate emission reductions using one of two simplified approaches (i.e. Option 1 or Option 2). For the ITMO programme, Option 2 is applied:

Option 2: using global default values derived from IPCC tier 1 approach. 31. Emission reductions shall be calculated, using default values of adjusted daily emission factor EFER (kgCH4/ha/day).

Documentation provided by the Programme Proponent

VVB Assessment Date: 04/04/2022

Requirement of paragraph 8 from the CDM methodology AMS-III.AU v04.0 is independent of the option used for emissions estimation. Default values and cultivation period of rice (L_y) may vary depending on the grouping of fields by cultivation patterns as per Table 2 of the methodology.

CAR still open.

Programme Proponent response

Tables 2 and 4 have been included in the MADD to explain the cultivation patterns in the baseline and project scenario.



Documentation provided by the Programme Proponent				
VVB Assessment Date: 07/04/2022				
The PP has made the adequate corrections.				
CAR closed.				

CAR ID	04	Date: 01/04/2022

Description of CAR

Section 3 of the MADD presents equation (2) of the CDM methodology AMS-III.AU v04.0 as the equation used to estimate ex ante GHG baseline emissions. However, this is not the applicable equation for estimation of emissions reductions using IPCC tier 1 approach or default values, as per section 5.8.2 of the methodology.

Additionally, insufficient information to allow the reader to reproduce the calculation of project emissions and net GHG reductions is provided.

Date: 01/04/2022

Programme Proponent response

The necessary corrections have been applied in the ITMO programme document and reference is now made to equation 6 of the methodology in line with IPCC tier 1, Option 2 approach.

Furthermore, a new table has been included to provide an overview of baseline emissions, project emissions and emissions reductions over the 9 years crediting period of the ITMO programme.

Documentation provided by the Programme Proponent

Insertion of a new table into section 3 of the MADD.

VVB Assessment Date: 04/04/2022

The PP has modified the equation presented in section 3 of the MADD to match the appropriate equation used from the CDM methodology for the calculations.

It is stated in the section 3 that Option 2 of the methodology is used. Also, it is stated in section 5 that the Emission Reductions in year y were calculated using default values of adjusted daily emission factor EF_{ER} (kgCH4/ha/day) in line with Option 2. This option requires the use of the of specific default values for EF_{ER} listed in paragraph 31 of the methodology. However, default factors are being used to estimate baseline and project emissions as per Option 1 of the methodology.

CAR still open.

Programme Proponent response	Date: 04/04/2022
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Throughout the MADD reference to Option 1 has been included.



Documentation provided by the Programme Proponent				
VVB Assessment	Date: 07/04/2022			
The PP has made the adequate corrections.				
CAR Closed				

CAR ID 05 Date: 01/04/2022

Description of CAR

Section 5 of the MADD states: "Under the CDM methodology AMS-III.AU "Methane emission reduction by adjusted water management practice in rice cultivation", default values are used, including the baseline emission factor (EF_{BL,c}) of 1.3 kg CH4/ha/day (IPCC 2019/refinement value)."

However, the default value used for calculations in the spreadsheet *Ghana_Emission Reduction Calculations_default values.xlsx* is 1.19.

Date: 01/04/2022

Programme Proponent response

The reference to the default value of 1.3 kg CH4/ha/day has been corrected to 1.19 kg CH4/ha/day as per the IPCC 2019 refinement value.

Documentation provided by the Programme Proponent

VVB Assessment Date: 04/04/2022

The PP has made the adequate corrections.

CAR closed.



Date: 01/04/2022

Date: 01/04/2022

CAR ID 06 Date: 01/04/2022

Description of CAR

No focal point for grievance mechanism for Switzerland is appointed in section 6 of the MADD.

Programme Proponent response

The focal point for grievance mechanism for Switzerland has been included.

Documentation provided by the Programme Proponent

VVB Assessment Date: 04/04/2022

The PP has made the adequate addition.

CAR closed.

Clarification Requests (CLs)

CL ID	01	Date: 01/04/2022

Description of CL

Provide the ITMO activity start date and crediting period, including star date and end date (DD/MM/YYYY).

Programme Proponent response

ITMO programme start date and crediting period start and end date has been included.

Documentation provided by the Programme Proponent

VVB Assessment Date: 04/04/2022

The PP has provided the programme start date (1-June-2022) and the start and end date of the crediting period (1-June-2022 to 30-December-2030). The duration of these crediting period is 8 years and 7 months. However, throughout the MADD it is stated that the crediting periods has a length of 9 years.

Clarify the crediting period length.

CL still open.

Programme Proponent response Date: 04/04/2022

Throughout the MADD, the crediting length has been revised to 8.7 years.



Documentation provided by the Programme Proponent

VVB Assessment Date: 07/04/2022

The PP has modified the crediting period in the MADD to 8.7 years. However, the crediting period is 8 years and 7 months (8.58 years).

CL still open.

Programme Proponent response

Date: 07/04/2022

The correction has been made throughout the MADD.

Documentation provided by the Programme Proponent

VVB Assessment Date: 08/04/2022

The PP has made the adequate correction.

CL closed.

CL ID 02 Date: 01/04/2022

Description of CL

Provide information on avoidance of double claiming of MO.

Programme Proponent response Date: 01/04/2022

The Government committed in the bilateral agreement with Switzerland to apply a corresponding adjustment to all ITMO programmes and projects implemented under this agreement, including the ITMO programme "Promotion of climate smart agriculture practices for sustainable rice cultivation in Ghana". The corresponding adjustment will ensure that the Mitigation Outcomes are not claimed twice.

Documentation provided by the Programme Proponent

Refer sub-part V to the Article 6.2 framework on corresponding adjustment

VVB Assessment Date: 04/04/2022

Provide this information in the MADD.

CL still open.



Programme Proponent response

The clarification how double counting is avoided has been included in the MADD.

Documentation provided by the Programme Proponent

VVB Assessment

Date: 04/04/2022

The PP has provided the requested information.

CL closed.

CL ID	03	Date: 01/04/2022			
Description of CL					
-	arameters fixed ex ante and data and parar QA/QC procedures, etc. as per section 6 of CD	_			
Programme Proponent re	sponse	Date: 01/04/2022			
This information has been u	updated in the ITMO Programme document.				
Documentation provided	by the Programme Proponent				
VVB Assessment	VVB Assessment Date: 04/04/2022				
Parameter L _y (Cultivation p	eriod of rice in year y) is missing.				
Provide values of the parar	neters fixed ex ante.				
CL still open.					
Programme Proponent re	Programme Proponent response Date: 04/04/2022				
Parameter Ly has been included in parameters fixed ex-ante.					
Documentation provided by the Programme Proponent					



VVB Assessment Date: 07/04/2022

Parameter L_y has been included. However, the values of the parameters fixed ex ante have not been included.

CL still open.

Programme Proponent response

Date: 07/04/2022

Date: 01/04/2022

The value of the parameter has been included.

Documentation provided by the Programme Proponent

VVB Assessment Date: 08/04/2022

The PP has included all parameters.

CL closed.

CL ID 04 Date: 01/04/2022

Description of CL

Throughout the MADD it is stated that the ITMO programme will extend AWD practices to a total of up to 20,500 ha per cropping season. Also, it is stated that the programme will be rolled-out over 3 years, starting in the first cropping season 2022 and with an expected full roll-out in 2024. However, this figure and adoption assumptions do not match with the assumed hectares implementing AWD used for ex ante GHG calculations.

Provide source or assumption rationale of the 20,500 ha per cropping season and hectares adopting AWD during the first 3 years.

Programme Proponent response

The calculation assumes 2 cropping seasons per year. The target areas and ha are aligned with the Government roll-out strategy and the financing agreement between the Federal Office of the Environment and UNDP. The rationale behind the ha coverage is based on the distribution of ITMOs across participating countries and project types and the negotiations between Switzerland and UNDP. The MADD says that AWD will be adopted over a maximum of 20,500 ha in 2026. The reference to 2024 has been corrected.

Documentation provided by the Programme Proponent



VVB Assessment Date: 04/04/2022

Year 2024 has not been corrected in page 5 of the MADD.

Provide assumptions of hectares participating in the programme throughout the crediting period in the MADD to allow the reader to reproduce calculations.

CL still open.

Programme Proponent response

Date: 04/04/2022

Date: 01/04/2022

The year number has been corrected and a table included with the ha coverage of AWD.

Documentation provided by the Programme Proponent

VVB Assessment Date: 07/04/2022

The PP has provided the requested information and made the adequate corrections.

CL closed.

CL ID 05 Date: 01/04/2022

Description of CL

In page 5 of the MADD, it is stated: "the ITMO programme runs for at least five years [...]" and "[...] generate mitigation outcomes over at least 5 years". However, throughout the document it is also stated that the crediting period length is 9 years.

Clarify the five years statement.

Programme Proponent response

The reference of 5 years is related to the agreement signed between UNDP and the Federal Office of the Environment which commits ITMO offtake from this ITMO programme for at least 5 years and the option to opt-out of the programme after 5 years. However, it is expected that the ITMO programme will continue until 2030 given the increasing ITMO needs of the Swiss Government.

Documentation provided by the Programme Proponent

VVB Assessment Date: 04/04/2022

Clarify this information in the MADD.

CL still open.



Programme Proponent response	Date: 04/04/2022			
The reference to 5 years has been clarified in the DPP.				
Documentation provided by the Programme Proponent				
VVB Assessment	Date: 07/04/2022			
The PP has provided the requested information.				
CL closed.				

CL ID	06	Date: 01/04/2022

Description of CL

In page 7 of the MADD, it is stated: "MOFA will facilitate the adoption and training of the agronomic aspects of the AWD together with the rice associations and CSIR-CRI, who will deliver the training under the ITMO programme. The trainings will follow existing manuals/guidance provided by CSIR-CRI for their trials in Kumasi. The trainings will be conducted in groups of up to 50 participants. During the trainings, irrigation calendars will be developed for each farmers association, and farmers will learn how to control the level of water in their fields. During the cropping seasons, the farmers associations will work with farmers and provide on-the-spot practical guidance on adopting AWD."

CDM methodology AMS-III.AU v04.0 applicability condition 3.(d) requires: "Training and technical support during the cropping season that delivers appropriate knowledge in field preparation, irrigation, drainage and use of fertilizer to the farmer is part of the project activity and is to be documented in a verifiable manner (e.g. protocol of trainings, documentation of on-site visits). In particular the Programme Proponent is able to ensure that the farmer by himself or through experienced assistance is able to determine the crop's supplemental N fertilization need. The applied method shall assess the fertiliser needs using for example a leaf colour chart or photo sensor or testing stripes. Alternatively, a procedure to ensure efficient fertilization considering the specific cultivation conditions in the project area backed by scientific literature or official recommendations shall be used."

Provide clarification whether the planned trainings of the ITMO programme include capacitation on the assessment of fertiliser needs or if procedures to ensure efficient fertilization in the programme area will be implemented.

Programme Proponent response

The CSIR-CRI and Ministry of Food and Agriculture manuals developed on AWD consider also N fertilization. The trainings will follow the content of the manuals. Please see attached the training manuals.

Documentation provided by the Programme Proponent

Climate smart agriculture training manual

Date: 01/04/2022



VVB Assessment Date: 08/04/2022

The PP has provided the training manual demonstrating that farmers will be trained on how to determine the crop's supplemental N fertilization need.

CL closed.

CL ID 07 Date: 01/04/2022

Description of CL

Provide assumptions and their justification used for the ex-ante estimations:

- a) Areas practising AWD per year.
- b) Water regimes in baseline scenario.
- c) Water regimes in project scenario.
- d) Number of cropping seasons per year.
- e) Cultivation period of rice in year (days).

Programme Proponent response

The ITMO project is a government programme which is implemented through a close collaboration between the Environmental Protection Agency (EPA), Ministry of Environment and Ministry of Agriculture. The programme was designed based on empirical knowledge of the sector, research pilot initiatives already successfully completed and a strategic goal to achieve transformational change in the sector.

Date: 01/04/2022

Date: 04/04/2022

For the ITMO programme, the following programme parameters were determined ex-ante:

- a) Target regions, target areas, farms and farmers invited to participate in the programme.
- b) No AWD is applied in the target farms.
- c) All farmers, who confirm their participation will commit to apply AWD.
- d) The target areas have all 2 cropping seasons historically.
- e) The target areas have 110 days cultivation period.

Documentation provided by the Programme Proponent

VVB Assessment Date: 04/04/2022

Provide assumptions in the MADD to allow the reader to reproduce calculations.

e) According to the calculation spreadsheet, the cultivation period is 135 days.

CL still open.

Programme Proponent response

A table summarizing above information has been included for baseline and project emission reduction calculations.



Documentation provided by the Programme Proponent		
VVB Assessment	Date: 07/04/2022	
The PP has provided the requested information and made the adequate corrections. CL closed.		

CL ID	08	Date: 01/04/2022		
Description of CL				
Provide clarification whether the baseline scenario includes continuously flooded fields with or without organic amendments.				
Programme Proponent response		Date: 01/04/2022		
There is no organic amendment in the baseline.				
Documentation provided by the Programme Proponent				
VVB Assessment		Date: 04/04/2022		
The PP has provided the requested information.				
CL closed.				

CL ID	09	Date: 01/04/2022		
Description of CL				
Provide units in equations and tables of section 3 of the MADD.				
Programme Proponent response		Date: 01/04/2022		
The places where no units are added are default factors.				
Documentation provided by the Programme Proponent				



 VVB Assessment
 Date: 04/04/2022

 The PP has provided the units.
 CL closed.

CL ID Date: 01/04/2022

Description of CL

In section 3 of the MADD, it is stated: "The ITMO programme full crediting period will be 9 years from 2022 to 2030."

Ghana's Framework for Cooperative Approach under Article 6.2 of the Paris Agreement, Unedited v1, states in section 2.17: "Limiting crediting period – for high impact MO activities, Ghana will limit the MO crediting period to between 5 to 7 years non-renewable over the NDC implementation period to guarantee a year for the same MO activities to generate MO to retire on Ghana's NDC target."

Provide clarification whether the ITMO programme qualifies as a high impact MO activity.

Programme Proponent response

Since this ITMO programme doesn't have any additional revenues, the programme will continue to generate revenues until the end of the NDC cycle to ensure stable revenues for farmers.

Date: 01/04/2022

Date: 04/04/2022

Documentation provided by the Programme Proponent

VVB Assessment Date: 04/04/2022

Provide further clarification on why the ITMO programme hasn't the obligation to comply with the 5-to-7-year limit to the crediting period.

CL still open.

Programme Proponent response

The 5-to-7-year limit is only applicable to projects which generate additional revenues beyond carbon revenues. There will also be an option for activity developers to set aside mitigation outcome units or equivalent investments to contribute towards achieving Ghana's NDC targets during or beyond the crediting period. All these will be clarified also in Ghana's Framework for Cooperative Approach under Article 6.2 of the Paris Agreement, Unedited v.1

Documentation provided by the Programme Proponent



 VVB Assessment
 Date: 07/04/2022

 The PP has provided the requested clarification.

 CL closed.

CL ID Date: 01/04/2022

Description of CL

Ghana's Framework for Cooperative Approach under Article 6.2 of the Paris Agreement, Unedited v1, requires in section 3.1.1: "MO activities acquire or demonstrate that it has obtained an environmental permit under the Environmental Impact Assessment Legislation (LI, 1652, 1999) to meet the sustainable development criteria."

Provide discussion regarding the state of the environmental permit of the ITMO programme.

Programme Proponent response

The ITMO programme does not require an Environmental Impact Assessment. Schedule 1 of Environmental Assessment Regulation (LI 1652, 1999) do not list rice cultivation as requiring an environmental permit before commencement.

Date: 01/04/2022

Documentation provided by the Programme Proponent

https://www.bcp.gov.gh/acc/registry/docs/ENVIRONMENTAL%20ASSESSMENT%20REGULATIONS,%20 1999%20(LI%201652).pdf

VVB Assessment Date: 04/04/2022

The PP has provided the requested clarification.

CL closed.



CL ID 12 Date: 01/04/2022 **Description of CL** Paragraph 37 of CDM methodology AMS-III.AU v04.0 requires: "Reporting and verification shall be done on the basis of samples of the log-books from the farmers, according to the latest version of the "Standard for sampling and surveys for CDM project activities and programme of activities"." Clarify whether the ITMO programme monitoring will imply sampling procedures and, if so, describe them. **Programme Proponent response** Date: 01/04/2022 The ITMO programme will require all farmers to complete their monitoring information via WebApps electronically on a digital platform which will be compiled by the Ghana Environmental Protection Agency. The information will also be made available to the verifier. We will therefore have complete inputs from all farmers participating in the ITMO programme and not only a sample. **Documentation provided by the Programme Proponent VVB** Assessment Date: 04/04/2022

The PP has provided the requested clarification.

CL closed.

CL ID	13	Date: 01/04/2022		
Description of CL				
In the list of annexes of the MADD, reporting sheets are listed. Provide them.				
Programme Proponent response		Date: 01/04/2022		
We shared the "Ghana Rice Monitoring Sheet".				
Documentation provided by the Programme Proponent				
VVB Assessment		Date: 04/04/2022		
The PP has provided the requested document.				
CL closed.				