ColCX Guide for the management of reversal risks, non-permanence risks and uncertainty

Version 1.0

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Content

Acronyms and abbreviations

GHG: Greenhouse Gases
GHGMP: Greenhouse Gas Mitigation Projects
REDD: Reducing Emissions from Deforestation and Forest Degradation

1. INTRODUCTION

Based on the Cancun Safeguards, specifically Safeguard F: "*Actions to address the risks of reversals*" (Decision 1/CP.16, paragraph 19), this methodology incorporates practical elements to implement measures that address potential carbon loss from the project. In this regard, it is essential to take actions related to forest monitoring and their carbon stock, which are outlined below. Additionally, risks of non-permanence will be considered, as well as the calculation of the buffer as a key mechanism to mitigate the potential risk of reversal.

Risk involves three fundamental concepts. The first is threat, which refers to an external element with the potential to cause harm; the second is vulnerability, which is associated with the capacity of a system to cope with or reduce a potential impact; and the third is capacities, understood as actions that enable the system to respond to the potential occurrence of a risk.

2. Reversion risks

The appropriate way to address reversion risks for the COLCX standard is to monitor key indicators to identify the integrity of the carbon stock in the long term. Therefore, it is mandatory for the GHGMP to monitor at each revalidation of the crediting period verification of the GHGMP; this considering the elements for the calculation of non-permanence risks shown below. The analysis of non-permanence risks must be complemented with monitoring activities of emission factors and forest cover, which must be complemented with a deforestation risk map and a deforestation early warning system. Once the early warning system and the deforestation risk map have been identified, actions to mitigate the associated risks should be established, and when the carbon released into the atmosphere is higher than projected in the verification of the GHGMP, this should be deducted from the buffer associated with the non-permanence risks.

3. Non-permanence Risks

In a GHGMP, the risks of carbon loss are associated with both internal and external contexts, which depend on political, economic, ecological, social, technological, and legal factors, as described in the safeguards chapter. The criteria outlined in the safeguards represent capacities that strengthen the GHGMP in preventing non-permanence risks; however, additional elements must be considered to enable proper quantification. All risks included in this analysis must be properly supported, considering their assumptions and technical information from official or recognized sources.

3.2 Internal risks

2.1. Social risks

Vulnerability factor	Numerical factor
The community or owners of the initiative have an ancestral culture of caring for the forests.	1
The community or owners are historically or culturally indifferent to forest conservation.	2
The community or owners have a culture based on extractivist economies.	3
Threat factor	**Numerical factor**
It was identified that external actors, especially neighbors, do not consider excessive logging as a cultural element of their own.	1
It was identified that some actors neighboring the GHGMP have a culture of deforestation, however, their influence in the project area is low.	2
Groups of stakeholders with influence over the GHGMP area have been identified whose practices are culturally linked to deforestation or whose economies are based on extractive activities.	3
Capacity factor	**Numerical factor**
The project recognizes and integrates 50% of the actors or neighbors that can cause deforestation	3
The project recognizes and integrates 20% of the actors or neighbors that can cause deforestation	1
$RS = (FV * FA) - FC$ *RS: Social risk* *FV: Vulnerability factor* *FA: Threat factor* *FC: Capacity factor*	

2.2. Legal Risks

Vulnerability factor	Numerical factor
Owners have a property title that allows them legal access to the use of the land and do not present tenure conflicts with third parties	1
The owners have a property title, but it has tenure problems, i.e. there are clearly identified third-party settlements within the territory	2

The owners have title to their property, but within their area there are settlements of third parties that have not been identified	3
Threat factor	**Numerical factor**
The owners have no territorial disputes with their neighbors	1
The owners have territorial disputes with their neighbors; however, coexistence agreements have been identified	2
The owners have territorial disputes with their neighbors and the relationship with them is hostile	3
Capacity factor	**Numerical factor**
The project has a short-term strategy to generate regional integration with third parties with which there are disputes over territory	3
The project has a long-term strategy that allows the integration of some neighbors with whom there are territorial disputes	1
$RL = (FV * FA) - FC$ *RL: Legal risk* *FV: Vulnerability factor* *FA: Threat factor* *FC: Capacity factor*	

2.3. Economic risks

Vulnerability factor	**Numerical factor**
In the analysis of financial costs, a cash flow analysis was performed that identifies that the break-even point of income and expenses will occur in less than two years after the validation of the GHGMP	1
In the analysis of financial costs, a cash flow analysis was performed that identifies that the break-even point of income and expenses will occur between three and six years after the validation of the GHGMP	2
In the analysis of financial costs, a cash flow analysis was performed to identify that the break-even point of income and expenses will occur more than seven years after the validation of the GHGMP	3
Threat factor	**Numerical factor**
No bank loan or source of financing was requested for the formulation of the GHGMP	1

For the formulation of the GHGMP, a bank loan or source of financing was requested for 20% to 40% of the total project cost	2
For the formulation of the GHGMP, a bank loan or source of financing for more than 50% of the total project cost was requested	3
Capacity factor	**Numerical factor**
GHGMP has several diversified investment strategies in green projects such as ecotourism and productive projects based on Non-Timber Forest Products (NTFPs), among others, all of which are 100% secured by the GHGMP.	3
The GHGMP has several diversified investment strategies in green projects such as ecotourism, productive projects based on NTFP, among others. These are 50% secured by the GHGMP.	1
$RE = (FV * FA) - FC$ *RL: Economic risk* *FV: Vulnerability factor* *FA: Threat factor* *FC: Capacity factor*	

2.4. Technological risks

Vulnerability factor	**Numerical factor**
GHGMP has its own team of professionals with more than 3 years of experience in the development and implementation of REDD+ projects	1
GHGMP has its own team of professionals with at least one year of experience in the development and implementation of REDD+ projects	2
The GHGMP does not have its own team of professionals with experience in the development and implementation of REDD+ projects	3
Threat factor	**Numerical factor**
The GHGMP has updated hardware (optimal performance according to software specifications) which allows the proponent to provide quality and security to the GHGMP information; and allows the proponent to perform the necessary geoprocessing.	1
The GHGMP has outdated hardware (it does not comply with the performance specified by the software), which does not allow the proponent to provide quality and security to the GHGMP	3

information, nor does it allow it to perform the necessary geoprocessing.

Capacity factor	Numerical factor
The GHGMP has an external consulting team with experience in the implementation of at least 3 REDD+ projects	3
GHGMP has an external consulting team with experience in at least one REDD+ project implementation	1
$RT = (FV * FA) - FC$ *RT: Technological risk* *FV: Vulnerability factor* *FA: Threat factor* *FC: Capacity factor*	

3.3 External risks

3.1. Ecological risks

Vulnerability factor	Numerical factor
Percentage of project area with low natural risk	Percentage value
Percentage of project area with medium natural risk	Percentage value
Percentage of project area at high natural risk	Percentage value
Threat factor	**Numerical factor**
Return time or frequency of occurrence of an extreme event greater than 50 years	1
Return time or frequency of occurrence of an extreme event between 30 to 50 years	2
Return time or frequency with which an extreme event occurs in less than 20 years	3
Capacity factor	**Numerical factor**
GHGMP subtracts areas at high risk from some type of high natural risk	Percentage extracted
$RE = \sum (FV_i - FC_i) * FA_i$ *RE: Ecological risk* *FV: Vulnerability factor* *FA: Threat factor*	

FC: Capacity factor i: refers to natural events associated with pests, fires, floods, hurricanes, the presence of species resistant to brackish water, etc.

3.2. Political risks

Vulnerability factor	Numerical factor
The host country has a comprehensive legal framework for REDD+, has a Monitoring, Reporting and Verification System, a forest monitoring system and its Reference Levels are subject to the following requirements	1
The host country has some legal developments on REDD+, is in the process of formulating its Monitoring, Reporting and Verification System, its forest monitoring system and/or its Reference Levels are in the process of being submitted	2
The host country has no legal development in REDD+ issues	3
Threat factor	**Numerical factor**
The host country based on the World Bank Institute's Worldwide Governance Indicators is higher than 0.19	1
The host country based on the World Bank Institute's Worldwide Governance Indicators is between 0.19 and -0.79	2
The host country based on the World Bank Institute's Worldwide Governance Indicators is less than -0.79	3
$RP = (FV * FA)$ *RP: Political risk* *FV: Vulnerability factor* *FA: Threat factor*	

The non-permanence risk corresponds to the sum of all the risks and will be the credits considered as non-tradable or "buffer". Note that none of the risks can be less than 1. The total sum of all the evaluated risks must have a minimum value of 10%, thus if the valuation obtained is less, the valuation of 10% will be given. If the risk of non-permanence is higher than 50%, the GHGMP cannot be implemented.

4. UNCERTAINTY

Uncertainty is understood as an estimation property of a parameter that can present randomness, quality, data quantity, bias, random error and associated factors. In the determination of GHG emission reductions and/or removals, and normally in any measurement, this property is implicitly present. Uncertainty can be expressed as a percentage confidence interval in reference to a mean value and depends on assumptions such as error and confidence statistic applicable to the nature of the data.

Uncertainty is usually associated with the difference between the actual value and the calculated value, which tends to differ for various reasons. Uncertainty can sometimes be easily detected, but in some cases, it can be difficult to quantify and identify, therefore, it is good practice for this methodology to justify and document uncertainty in a rigorous manner, which implies including in a clear way the reasons and causes that were considered for its estimation. The sources of uncertainty are normally:

- Lack of completeness: This occurs when a form of measurement is still unknown or underdeveloped, which can lead to incomplete or erroneous conceptualization; this type of bias can contribute to uncertainty.
- Model: Models can introduce random and bias errors due to the following situations:
  - Models function as a simplification of real systems; thus, they are often inaccurate.
  - The interpolation of models within a system of input ranges can be valid. However, some systems tend to make hidden extrapolations which leads to it being constructed with data that were not the same as the input data.
  - Extrapolation involves taking a model beyond the range under which it was calculated; this usually has errors.
- Lack of data: In some cases, data are simply not found, so in some cases they are extrapolated or obtained from others. When this occurs, it is necessary to document how the quantification of uncertainty is approached.
- Lack of representativeness of the data: This uncertainty is associated with the lack of correspondence between the conditions linked to a piece of data. This occurs in cases such as data that are representative under particular situations that do not reflect the totality of a population.
- Statistical random sampling error: This error is usually associated with the variance of the data. It is often reduced by taking more random and independent samples. In this sense, it is necessary to differentiate between uncertainty and variability. As a good practice, it is recommended that emission uncertainty analyses be performed on an annual basis and not over extended periods of time, since estimating emissions over longer time intervals can lead to an increase in inherent error.
- Measurement error: These errors can be random or systematic. These usually occur at the time of measurement and are associated with human and instrumental errors, errors arising from the sources of information or their processing.
- Misclassification: Usually associated with an erroneous, unclear or erroneous definition of an emission or absorption. These errors are also classified as biases.

- Missing data: Usually associated with a detection limit, i.e. when there is information that cannot be detected for different reasons, the most conservative scenario should always be taken.

To reduce all types of errors, this methodology considers the following criteria:

- Uncertainties will be calculated based on IPCC guidelines. On the other hand, errors from carbon pools should be clearly identified and described.
- Based on this, the proponent must demonstrate that year to year for any emission estimate, the calculated uncertainty is less than 10%. If greater, the discount factors shown in Table 1 shall be applied.
- A statement of uncertainty should be made, considering a clear conceptualization of the measurements and ways of measuring the different variables involved in carbon accounting.
- The proponent must include a protocol for data collection in the field, including the measurement instruments, their technical specifications and the ways in which measurement errors are expected to be reduced, such as calibration methods, training, among others.
- The proponent should make a clear identification of the uncertainty related to the models used in the analysis of alternatives for the construction of the baseline scenario. The uncertainty in the models should be key to the choice of the most appropriate model. To ensure that their absolute percentage error (MAPE) is the minimum possible.
- For activity data, the proponent must perform confusion matrices, identify errors of commission and omission based on these, construct confidence intervals for each category and ensure that these are less than 10%. The uncertainty in the activity data should be calculated year by year.
- In the case of areas without information, the proponent must have a protocol for the treatment of these areas. This protocol must consider the criteria of conservatism, accuracy and integrity.

The errors associated with each of the variables such as carbon reservoirs, activity data, among others, can come from secondary information such as FRELs, applicable GHG inventories and scientific articles from indexed journals only when applicable to the study area. To be applicable, it must be representative, have an overlap with the project area, be consistent with ecosystem types, among others.

Two formulas based on the theory of error propagation can be used to calculate uncertainties:

When combining uncertainties by multiplication

$$U_{total} = \sqrt{U_1^2 + U_2^2 + \cdots\ U_n^2}$$

U_{total}: Percentage of uncertainty associated with a confidence interval.
U_i^2: Uncertainty associated with each quantity.

When uncertainties are combined by addition

$$U_{total} = \sqrt{\frac{(U_1 * X_1)^2 + (U_2 * X_2)^2 + \cdots (U_n * X_n)^2}{|X_1 + X_2 \ldots X_n|}}$$

U_{total}: Percentage of uncertainty associated with a confidence interval.
X_n: Uncertain amount.
U_1: Percentage uncertainty associated with an uncertain quantity
For cases in which the uncertainty determination is greater than 10% with a confidence interval of 95%, a discount factor should be applied to meet the criterion of conservatism. This value will correspond to the value shown in the following table.

Table 1 Uncertainty discount factors [1]

Uncertainty (%)	Discount factor	Value to use
x < 10%	0%	Example: the average is estimated as follows 60 ± 9 tCO2e/h. Discount: 25% x 9 = 2.25 tCO2e/h. Conservatively as follows: In baseline: 60+2,25=62,25 tCO2e/h In the project: 60-2,25=57,75 tCO2e/h
10% < x < 15%	25%	
15% < x < 20%	50%	
20% < x < 30%	75%	
30% < x	100%	

In the baseline emissions estimate, this value will be subtracted from the value obtained, while in the formulation scenario this value will be added to the estimate of formulation emissions and in the leakage area, thus taking a conservative approach to estimates.

History of the Document

Version	*Date*	*Description*
1.0	10-08- 2023	Development initial version

[1] See Appendix 2 MDL: https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-14-v4.1.pdf