



Jurisdictional & Nested REDD+

A VERRA STANDARD

JNR ALLOCATION TOOL GUIDANCE



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1 SUMMARY DESCRIPTION OF THE TOOL

1.1 Scope

The *JNR Allocation Tool* (“the Tool”) allows allocating portions the jurisdictional Forest Reference Emission Level (FREL) to nested projects and lower-level jurisdictional programs according to the risk of deforestation and forest degradation. The allocated portions of the FREL will serve as baselines for nested projects and lower-level jurisdictional programs during the FREL validity period.

1.2 Objective

The *JNR Allocation Tool* helps achieving the following goals:

- 1) Construction of a jurisdictional FREL for nesting that complies with Verra’s Jurisdictional and Nested REDD+ requirements (*JNR Requirements*).
- 2) Allocation of the jurisdictional FREL to nested projects and jurisdictional programs using a consistent methodological approach within the jurisdictional program boundary.
- 3) Preservation of the environmental integrity and fungibility of the Verified Carbon Units (VCUs) issued to nested projects and jurisdictional programs.

1.3 Methodological Approach

The *JNR Allocation Tool* allocates a larger portion of the jurisdictional FREL to areas where the risk of deforestation or forest degradation is high than to areas where the risk is low. The allocation ($PFREL_p$) is calculated using the following equations:

$$PFREL_p = \sum_1^I PFREL_{p,j} \quad (\text{Eq. 1})$$

$$PFREL_{p,j} = PFREL_j * \sum_1^I (\%HE_{j,i} * \%FLA_{p,j,i}) \quad (\text{Eq. 2})$$

$$FREL_{JNR} = \sum_1^I PFREL_j \quad (\text{Eq. 3})$$

Where:

$PFREL_p$ Portion of the jurisdictional FREL complying with the *JNR Requirements*; ($FREL_{JNR}$) allocated to project or jurisdictional program p ; tCO₂-e.

$PFREL_{p,j}$ Portion of the $FREL_{JNR}$ allocated to project or jurisdictional program p in stratum j ; tCO₂-e.

$FREL_{JNR}$ Jurisdictional FREL complying with the *JNR Requirements*; tCO₂-e.

$PFREL_j$ Portion of the $FREL_{JNR}$ corresponding to stratum j ; tCO₂-e.

I Total number of risk classes in the deforestation or degradation risk map; dimensionless

J	Total number of strata in lands classified as “forest”; dimensionless.
$\%HE_{j,i}$	Percentage of the total historical GHG emissions occurred within the jurisdictional program boundary in stratum j and risk class i ; dimensionless.
$\%FLA_{p,j,i}$	Percentage of the total area classified as “forest” at the beginning of the FREL validity period (or end of the historical reference period of the FREL) within the boundary of the project or jurisdictional program p in stratum j and risk class i ; dimensionless.

Risk Mapping

The allocation methodology requires the risk of deforestation and forest degradation to be spatially determined using historical data on deforestation and forest degradation, respectively. Risk maps can be created with the most recent version of the *JNR Risk Mapping Tool*¹ or any other methodology that produces risk maps of higher quality than those created with the *JNR Risk Mapping Tool*. The quality of the risk maps shall be assessed using the methods for comparing and selecting the best risk map described in the most recent version of the *JNR Risk Mapping Tool*.

Areas where the Risk is Considered Insignificant and Therefore Negligible

Risk maps shall include areas where the risk of deforestation or forest degradation is insignificant and to those areas the *JNR Allocation Tool* will not allocate any portion of the jurisdictional FREL. The areas of insignificant risk must be determined following the methods described in the most recent version of the *JNR Risk Mapping Tool*.

In the *JNR Allocation Tool*, the areas of insignificant risk correspond to the risk class “0”.

Avoidance of Double-Counting Emission Reductions Credited in Past Periods

Projects that generated Verified Carbon Units (VCUs) for avoided deforestation or avoided forest degradation in past baseline periods should not be credited again for the same GHG emission reductions in the current and any future FREL validity periods. To avoid this to happen, the following applies:

- 1) Areas credited for avoided deforestation in past periods should be included in the “0” risk class of both, the deforestation and the forest degradation risk map, not because they are assumed to be under negligible threat, but because they were already credited.
- 2) Areas credited for avoided forest degradation in past periods should be included in the “0” risk class of the forest degradation risk map only. In the *JNR Allocation Tool* these areas should be presented in a separate forest stratum, with a carbon stock that is equal to the difference between the actual carbon stock and the already per-hectare credited GHG emission reductions for avoided forest degradation.

¹ The Risk Mapping Tool is out for consultation and piloting until June 15th, 2021.

If spatially explicit information on the exact areas that generated carbon credits in past periods is unavailable so that these areas cannot be included in the risk class "0", the number of verified GHG emission reductions (VCUs and buffer credits) must be provided in the sheet DATA.2. To avoid double counting of already credited GHG emission reductions, the JNR Allocation Tool calculates the maximum mitigation potential existing within the jurisdictional program boundary and within each project area and deducts from the estimated maximum potential the number of GHG emission reductions verified in past periods. The resulting remaining mitigation potential is used to cap the allocation to nested projects and jurisdictional programs so that the allocated portion of the FREL does not exceed the remaining mitigation potential.

The maximum mitigation potential is calculated with the following equations:

$$MMP_p = \sum_1^j MMP_{p,j} \quad (\text{Eq. 4})$$

$$MMP_{p,j} = \sum_1^i (AWEF_{p,j} * FLA_{p,j,i}) \quad (\text{Eq. 5})$$

$$AWEF_{p,j} = DHE_{p,j} * BCAD_{p,j} \quad (\text{Eq. 6})$$

Where:

MMP_p Maximum mitigation potential of project or jurisdictional program p ; tCO₂-e

$MMP_{p,j}$ Maximum mitigation potential of project or jurisdictional program p in forest stratum j ; tCO₂-e

$AWEF_{p,j}$ Area-weighted average historical emission factor of project or jurisdictional program p in forest stratum j ; tCO₂-e/ha

$FLA_{p,j,i}$ Area of forest stratum j and risk class i in project or jurisdictional program p ; ha

$DHE_{p,j}$ Discounted historical emissions in forest stratum j , in project or jurisdictional program p ; tCO₂-e

$BCAD_{p,j}$ Bias-corrected historical activity data in forest stratum j , in project or jurisdictional program p ; ha

Note - The JNR Allocation Tool sets to zero the maximum mitigation potential of the risk class that represents areas of insignificant risk because no GHG emission reduction can be generated in these areas. Areas of insignificant risk in the tool are identified with the code label "0" (See AK23:AK122 in sheet RISK.MAP for the jurisdictional program area and AK23:AK122 in sheet ALLOCATION for nested project and jurisdictional program areas).

Note - The JNR Allocation Tool assumes that GHG emission reductions credited in past periods are distributed across Forest Land strata and risk classes in the same proportions that historical GHG emissions are distributed across Forest Land strata and risk classes. It also assumes that no GHG emission reduction credited in past periods was originated in areas where the risk of deforestation or forest degradation is insignificant.

Construction of the Jurisdictional Forest Reference Emission Level (FREL_{JNR})

The *JNR Allocation Tool* calculates the jurisdictional FREL with user-provided data and following *JNR Requirements*. Therefore, the tool can be used for the construction of the jurisdictional FREL or for the reconstruction and validation of an existing FREL for nesting purposes. If the data meet *JNR Requirements*, the FREL constructed with the *JNR Allocation Tool* will also meet the *JNR Requirements* (FREL_{JNR}).

Uncertainty Analysis and Discount Factor

The *JNR Allocation Tool* performs an uncertainty analysis using error propagation and applies a conservative discount factor (DF%) to the estimated historical GHG emissions when the standard error of the estimated GHG emissions is more than 10%. The discount is calculated with the following equations:

$$DHE = (100\% - DF\%) * EHE \quad (\text{Eq. 7})$$

$$DF\% = - SE\% * TINV(2 * p, DF) \quad (\text{Eq. 8})$$

Where:

DHE_d Discounted historical GHG emissions; tCO₂-e

EHE Estimated historical GHG emissions; tCO₂-e

DF% Discount factor calculated with Eq. 8; dimensionless

SE% Standard error of the estimated historical GHG emissions, expressed as a percentage of the estimated historical emissions; dimensionless

TINV Left-tailed inverse of the Student's t - distribution.

p Probability or tolerable overestimation (= 33%); dimensionless

DF Degrees of freedom (= 99999); dimensionless

Note - In the JNR Allocation Tool, the discount factor (DF%) is calculated with the standard error (SE%) of the total of the estimated historical GHG emissions (See Z1025 in sheet PREL.FREL) and then Eq. 7 is applied with the estimated discount factor to all land-use transitions (See AA24:AA1023, sheet PREL.FREL).

Note - The JNR Allocation Tool also calculates for each land use transition the ratio “discounted historical emissions” over “estimated historical emissions” (See AB24:AB1023 in sheet PREL.FREL); this ratio is used to convert estimated historical emissions to discounted historical emissions in the rest of the tool.

2 APPLICABILITY CONDITIONS

The *JNR Allocation Tool* is applicable under the following conditions:

- Where the jurisdictional proponent has developed a jurisdictional FREL for nesting that meets the *JNR Requirements* for jurisdictional FRELS.
- Where the national government has proposed, endorsed, or not objected to the use of the jurisdictional FREL for project baseline and lower-level jurisdictional FREL allocation.
- The tool is currently applicable to the following REDD+ activities:
 - a) Unplanned deforestation.
 - b) Planned deforestation.
 - c) Unplanned forest degradation.
 - d) Planned forest degradation.

The *JNR Allocation Tool* is not applicable in the following conditions:

- The current version of the *JNR Allocation Tool* is not applicable to carbon enhancement activities or to REDD+ activities that include peatlands and soil organic carbon because emissions factors in the Tool are calculated as the difference in carbon stocks, a method that cannot be used for peatland and soil organic carbon. Likewise, emissions from biomass burning are not included in this version of the Tool.

Note – Verra is exploring methodologically robust and credible options to establish jurisdictional FRELS that include GHG removals (e.g., through afforestation/reforestation), as well as emissions and removals from soil organic carbon, organic soils and emissions from biomass burning.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

The following data are required to use the *JNR Allocation Tool*:

- 1) Definition of the start date and end date of the jurisdictional FREL historical reference period and FREL validity period, consistently with the *JNR Requirements* on minimum and maximum duration of these periods and maximum time interval between them.
- 2) Definition, separately for each REDD+ activity included in the jurisdictional FREL, of the approach used in the construction of the jurisdictional FREL. The current version of the *JNR Allocation Tool* allows using the following three approaches:
 - a) Historical average emissions.
 - b) Historical average emissions plus and adjustment factor.
 - c) Linear extrapolation of the historical trend in emissions.

However, according to the most recent version of the *JNR Requirements*, only approach "a" (Historical average emissions) can be used to construct a FREL_{JNR}. If the user of the *JNR Allocation Tool* chooses approach "b" or approach "c", the Tool will issue a holdover alert that these approaches do not meet current *JNR Requirements*.

Note – Verra is exploring methodologically robust and credible options to establish jurisdictional FRELs that include increasing GHG emissions where they can be justified by national circumstances (e.g., high forest low deforestation countries and countries with legacy GHG emissions, e.g., from peatland decomposition).

- 3) Carbon stock estimates for each IPCC land-use class and its stratification in strata and sub-strata, consistent with the land use stratification used in the construction of the jurisdictional FREL.
- 4) Standard error estimates of the carbon stock estimates as determined according to the most recent version of the *JNR Requirements* on uncertainties.
- 5) Wall-to-wall map of the Forest Land stratification and sub-stratification used in the construction of the jurisdictional FREL.
- 6) Historical activity data estimates for each land-use change transition considered in the construction of the jurisdictional FREL, for the entire jurisdictional area and for each nested project and lower-level jurisdictional program. Activity data estimated through pixel-counts shall be bias-corrected following the most recent *JNR Requirements* on uncertainties.
- 7) Standard error of the estimated activity data as determined according to the most recent version of the *JNR Requirements* on uncertainties.

- 8) Wall-to-wall historical activity data maps for each REDD+ activity included in the jurisdictional FREL, as consistent as possible (but not necessarily equivalent) with the activity data estimates used in the construction of the FREL.
- 9) Wall-to-wall maps for the entire jurisdictional area depicting up to 31 risk classes for each unplanned REDD+ activity included in the jurisdictional FREL. These risk maps must include the class “0” representing areas of insignificant risk, as required in the *JNR Risk Mapping Tool*.
- 10) A wall-to-wall Forest Cover Benchmark Map (FCBM) covering the entire jurisdictional area. The FCBM shall represent areas of land that meet the national definition of “forest” on either the start, middle, or end date of the FREL historical reference period, so that additional FCBMs can be built, as needed, by combining the known FCBM with the map of historical deforestation.
- 11) A map of the jurisdictional program and project boundaries to which a portion of the FREL will be allocated.
- 12) For each REDD+ activity included in the FREL, and for each jurisdictional program and project, a map with the areas that were credited in past periods. If such a map does not exist and cannot be created, data on the total number of verified emission reductions credited in past periods (VCUs and buffer credits), separately for each REDD+ activity, project and jurisdictional program.
- 13) If planned activities are included in the jurisdictional FREL, the following additional data are required:
 - a) A map of the areas to which different types of deforestation or degradation permits have been awarded during the FREL historical reference period and that are expected to be awarded during the FREL validity period.
 - b) The estimated historical activity data rate (deforestation rate, degradation rate) for each type of permit.

Note - If such data are not available for certain types of permits, the JNR Allocation Tool will calculate the FREL allocation to projects avoiding planned deforestation and planned degradation in the same way it does it for projects avoiding unplanned deforestation and unplanned degradation.

The tool assumes that the estimates of activity data and of emission factors across land use strata are independent. Notably, for each stratum, a separate dataset must underlie the estimation of carbon stocks. Since living biomass must be measured from plot-based field measurements, subsets of all plots must be analysed separately for each stratum. Where strata use the same dataset, they must be merged into one single stratum.

4 PROCEDURES

4.1 Excel Version

The *JNR Allocation Tool* uses functions that are available only in Excel for Microsoft 365 and may not work when using earlier Excel versions.

4.2 Instructions and Explanations

The *JNR Allocation Tool* is an Excel workbook composed of 11 worksheets, whose tabs are named START, DATA.1, DATA.2, DATA.3, DATA.4, PREL.FREL, RISK.MAP, ALLOCATION, SUMMARY, LISTS, and REFS.

The worksheets DATA.1, DATA.2, DATA.3, and DATA.4 have been designed for data entry (see Section 4.3), while the sheets PREL.FREL, RISK.MAP, ALLOCATION, and SUMMARY perform calculations and do not require any interaction with the user of the Tool, except for cell G9 and the “GENERATE SUMMARY” button in the SUMMARY worksheet (see Section 4.5). Each of these 8 worksheets contain various tables, and each table is preceded by a box that contains either “INSTRUCTIONS” or “EXPLANATIONS”.

INSTRUCTIONS are provided for tables in worksheets where the user is expected to entry data.


EXPLANATIONS are provided for tables in worksheets where the Tool performs calculations. The user of the Tool does not have to provide any input in the tables preceded by an “EXPLANATIONS” box. Explanations are given for the sole purpose of helping the user of the Tool to better understand the calculations that the Tool performs.

4.3 Data Entry

Four worksheets of the Tool have been designed for data entry; their worksheet tabs are named DATA.1, DATA.2, DATA.3, and DATA.4. All other worksheets of the Tool do not require any data inputs.

In the four DATA worksheets, the fields that require inputs from the user are highlighted in light yellow; cells that have a different color are not for data entry and users should not attempt to modify them.

 = Editable cell for data entry

 = Non-editable cell with formulas, instructions, or explanations

In all DATA worksheets, the tables requiring data inputs are preceded by a box containing detailed instructions that should be carefully followed. These boxes are titled with the word “INSTRUCTIONS”.

It is very important to fill out the DATA.1 worksheet first, and then the worksheets DATA.2, DATA.3, and DATA.4 in this numbered order. Altering the data entry sequence will make working with the Tool difficult and may prevent the Tool from working properly. This is because data entered in the DATA.1 worksheet activates certain data input fields in the DATA.2 worksheet, and data entered by the user in the DATA.1

and DATA.2 worksheets will activate drop-down lists and enable the calculation of certain fields in the DATA.3 and DATA.4 worksheets.

4.4 Calculation Options in the Menu Tab “Formulas”

Before filling the DATA worksheets, it is recommended to go to the menu tab “Formulas”, click on “Calculation Options”, and then on “Manual” to avoid that Excel stops working when filling the worksheets with data.

When filling the worksheet DATA.1 has been completed, it is necessary to go back to the menu tab “Formulas” and click on “Calculate Sheet”. This may activate new fields in the worksheet DATA.1 that require additional data inputs. Before continuing, it is important to carefully check that all fields requiring data inputs have been duly filled in with the required data entries.

When finishing working with worksheet DATA.1, move to the worksheet DATA.2 and go to the menu tab “Formulas” and click on “Calculate Sheet”. When Excel finalizes the calculations, go back to the menu tab “Formulas”, click on “Calculation Options”, and then on “Manual” and start filling out the worksheet DATA.2. Fill out the worksheet following the instructions given in the “INSTRUCTION” boxes, click on “Calculate Sheet”, and check carefully that all fields requiring data inputs have the required data entries.

Repeat the same procedure when filling out the worksheets DATA.3 and DATA.4.

Before saving the file, make sure that in the menu tab “Formulas” the “Calculation Options” are switched to “Automatic Except for Data Tables”.

4.5 Structure of the Tool

The *JNR Allocation Tool* is an Excel workbook containing the following 11 worksheets:

- | | |
|--------|--|
| START | This worksheet provides an overview of the Tool and describes its applicability and data requirements. It also includes basic instructions for using the Tool and a description of each worksheet contained in it. |
| DATA.1 | In this worksheet the user of the Tool is expected to provide information on several key parameters of the jurisdictional FREL. The worksheet contains several tables requiring data inputs in the cells highlighted in light yellow. Each table is preceded by a box containing instructions that should be carefully read and followed. It is very important to fill out this worksheet first, otherwise it may not be possible to work with the worksheets DATA.2, DATA.3 and DATA.4. |
| DATA.2 | This is the worksheet where information on projects and jurisdictional programs must be provided. As in all other DATA worksheets, an instruction box provides the necessary guidance to fill the table below it.

In the case of grouped projects, if the “remaining mitigation potential” is to be calculated separately for each component of the program, list each component as a separate project. |

DATA.3 This is the worksheet where activity data from the FREL historical reference period must be provided, disaggregated for each carbon accounting area (project and jurisdictional program areas), land-use transition, REDD+ activity included in the jurisdictional reference level, and risk class.

Filling out this worksheet therefore requires extracting the required information from various maps using appropriate spatial analysis tools.

Sometimes, depending on the number of observations collected for the FREL historical reference period, multiple land-cover transitions are present in the historical data set. For practical reasons, changes in land-cover, in the context of REDD+, are often interpreted as land-use changes. Consistent definitions of REDD+ activities across the VCS-JNR project portfolio are required to ensure the fungibility of the VCUs. This implies that activity data corresponding to different categories of land-use change must be interpreted and classified into a REDD+ activity using consistent decision rules. To ensure that multiple land-use transitions are interpreted consistently and classified into REDD+ activities in a consistent manner, Verra has included optional guidance for decision rules in Appendix 1 Land-use transitions must be applied when generating activity data inputs for the worksheet DATA.3.

DATA.4 The Tool requires generating a Forest Cover Benchmark Map (FCBM) depicting the different land uses (i.e., Forest Land strata and, when applicable, sub-strata) existing at the beginning of the FREL validity period within each combination of risk classes and nested projects and lower-level jurisdictional programs.

As in the case of the worksheet DATA.3, filling out the worksheet DATA.4 requires extracting the required information from various maps using appropriate spatial analysis tools.

If no FCBM exists for the start date of the FREL validity period, a FCBM the end date of the historical reference period of the FREL can be used instead.

PREL.FREL In this worksheet, the Tool automatically constructs a preliminary version of the jurisdictional FREL for the REDD+ activity selected in the sheet SUMMARY (Cell G9). The calculation of emission factors, activity data, historical GHG emissions, and related uncertainty analysis, as well as the calculation of discount factors following *JNR Requirements* (See Eq. 4 and Eq 5) can be found in this sheet.

The jurisdictional FREL calculated in this sheet does not take into consideration GHG emission reductions that were verified in past periods, except if the areas that generated these GHG emission reductions have been included in the “0” risk class. For this reason, the jurisdictional FREL calculated in the worksheet PREL.FREL is a preliminary version of the jurisdictional FREL. The final version is calculated in the sheet RISK.MAP.

The worksheet PREL.FREL contains various tables. Each of these tables is preceded by a box containing detailed explanations of the calculations performed in the table below it.

RISK.MAP In this worksheet, the tool calculates the three variables that are needed for calculating the allocation (See Eq. 1, Eq. 2, and Eq. 3):

- The Jurisdictional FREL complying with *JNR Requirements* ($FREL_{JNR}$) as well as the portion of it corresponding to each Forest Land stratum ($PFREL_j$).
- The percentage of the total historical GHG emissions occurred within the boundary of the jurisdictional FREL in Forest Land stratum j and risk class i ($\%HE_{j,i}$).
- The percentage of the Forest Land area existing at the beginning of the FREL validity period (or end of the FREL historical reference period) within the boundary of the project or jurisdictional program p in Forest Land stratum j and risk class i ($\%FLA_{p,j,i}$).

To avoid double crediting of emission reductions verified in past periods, this worksheet also calculates the remaining mitigation potential that exists within the boundary of the jurisdictional FREL after deducting the GHG emission reductions verified in past periods from the maximum mitigation potential (See Eq. 6, Eq. 7, and Eq.8). This calculation is carried out automatically for the GHG emission reductions verified in past periods that the user of the Tool reports in the worksheet DATA.2. For this reason, if the areas that generated verified GHG emission reductions in past periods have been included in the “0” risk class, no verified GHG emission reductions from past periods should be reported in the worksheet DATA.2,

The preliminary jurisdictional FREL calculated in the worksheet PREL.FREL is compared with the remaining mitigation potential and if it is lower than the remaining mitigation potential, the final jurisdictional FREL will be equal to the preliminary jurisdictional FREL calculated in the worksheet PREL.FREL, otherwise the preliminary jurisdictional FREL is capped so as not to exceed the remaining mitigation potential.

As with the sheet PREL.FRE., the worksheet RISK.MAP contains various tables, each preceded by a box containing detailed explanations of the calculations performed in each table.

ALLOCATION This sheet calculates the portion of the jurisdictional FREL allocated to the project or jurisdictional program that the user of the tool selects in the cell G9 of the worksheet SUMMARY.

To avoid double-counting of GHG emission reductions verified in past periods, this worksheet also calculates the maximum and the remaining mitigation potentials that exist within the selected project or lower-level jurisdictional program boundary in the same way as for the jurisdictional FREL in the worksheet RISK.MAP. The calculated remaining mitigation potential is used to cap the portion of the jurisdictional FREL allocated to the selected project or lower-level jurisdictional program when the preliminarily calculated allocation surpasses the remaining mitigation potential.

If the selection made in cell G9 of the worksheet SUMMARY is a planned deforestation or planned forest degradation activity, the allocation is calculated either by extrapolating

activity data with the user-defined activity rate (See P32:P36 for planned deforestation and P43:P47 for planned forest degradation in the worksheet DATA.1) or, if no activity rate has been specified by the user, in the same way as for unplanned deforestation and unplanned forest degradation (i.e. using Eq. 1, Eq. 2, and Eq. 3).

As in the previously described worksheets, the worksheet ALLOCATION contains various tables. Each table is preceded by a box containing detailed explanations.

SUMMARY In this worksheet, the user of the Tool can select (from a drop-down list contained in Cell G9) the project and the REDD+ activity for which the jurisdictional FREL should be calculated and allocated.

The worksheet also includes an Excel macro that can be executed by clicking on the button "GENERATE SUMMARY". The macro will generate a summary table that will show the allocation calculated for each of the nested projects and lower-level jurisdictional programs for which the user provided the required data in the worksheets DATA.1, DATA.2, DATA.3, and DATA.4.

Generating the summary table may cause MS Excel to stop working for several minutes while the data table is being calculated.

LISTS This worksheet contains parameters that are linked to formulas and drop-down lists in other worksheets of the Tool. No calculation is performed in this worksheet.

REFS This worksheet contains references cited in other worksheets of the Tool

5 REFERENCES

IPCC, 2000. Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories; Chapter 6: Quantifying Uncertainties in Practice; Section 6.3: Method for Combining Uncertainties, p. 6.12.

FAO, 2020. Integration of remote-sensing and ground-based observations for estimation of emissions and removals of greenhouse gases in forests. Global Forest Observations Initiative.

APPENDIX 1: GUIDANCE ON HOW TO INTERPRET LAND-USE TRANSITIONS TO BE CLASSIFIED AS REDD+ ACTIVITIES IN THE CONTEXT OF VERRA'S JNR REQUIREMENTS.

Note: the following guidance aims to facilitate the correct identification of land-use transitions for the estimation of the associated GHG emissions. However, it must be noted that the use of this guidance is not mandatory and that it does not represent or contain additional requirements to those set out in the JNR Requirements.

Forest

Is a land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO, or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, minimum tree height and minimum level of crown cover, with absence of other predominant land uses, and may include mature, secondary, degraded and wetland forests, of both, natural and anthropogenic origin.

Following the *JNR Requirements*, the definition of forest used in the construction of the FREL shall be specified and shall be consistent with the forest definition used for reporting under the UNFCCC.

In the context of this guidance document, a “forest” is an area that is deemed to meet the national definition of “forest” and that has met it uninterruptedly for at least the last 10 years.

To identify forest lands, the following guidance may be applied:

- 1) When estimating a jurisdictional FREL, if at the beginning of the historical reference period the stratification of forests includes land use classes (or strata) of young forests, such as forest plantations and secondary forests,² jurisdictional proponents would need to obtain data for the previous 4 to 10 years (depending on the length of the chosen historical reference period) to prove that these lands have contained forests for the last 10 years.
- 2) Land with a surface area, tree height, and tree canopy cover that meets the definition of “forest” for less than 10 consecutive years should be considered “temporarily stocked” and shall not be classified as “forest”, except in the case of “afforestation” and “reforestation”.

² Secondary forests are even-aged natural forests that developed on an abandoned cropland or grassland.

- 3) Land that is eligible for “afforestation” and “reforestation”, shall be considered “forest” land from the moment seedlings are planted or natural regeneration is induced by artificial means with the intention to create a forest plantation or restore the forest in the long term (i.e., at least 30 years).

Temporarily unstocked

A forest may be “temporarily unstocked” due to natural disturbances or timber harvests if these are followed by natural regeneration or replanting, and the land is not permanently converted to a non-forest land use category. In such cases, the temporary absence of trees is not indicative of a land use-change and the change in tree canopy cover shall not be considered “deforestation”. In order to identify “temporarily unstocked” areas, the following guidance may be applied:

- 1) Areas of “forest” whose surface area, tree height, and canopy cover have fallen below the definition of “forest” can be classified as “temporarily unstocked” if there is enough information to ensure that the land will remain as a “forest” and maintain the average carbon stock of the forest class (or stratum) to which it belongs in the long term.
- 2) If an area remains “temporarily unstocked” (i.e., without meeting the definition of “forest”) for more than 10 consecutive years, it must be assumed that a conversion to non-“forest land” has taken place.
- 3) Emissions associated with the temporary removal of trees shall not be considered in the construction of the FREL or while monitoring actual emissions during the jurisdictional or project crediting period.
- 4) In “temporarily unstocked” areas, removals associated with natural regeneration after natural disturbances or post-harvest replanting shall not be accounted for in the construction of the FREL and monitoring of actual removals during the jurisdictional or project crediting period.
- 5) If after a natural disturbance or harvest event, the land is converted to non-forest (i.e. cropland, grassland, settlements, wetlands, other land and any of their sub-classes), the land shall be considered *deforested* and not “temporarily unstocked”.

Temporarily stocked:

Areas of non-forest may be “temporarily stocked” with trees whose surface area, height, and canopy cover meet the definition of “forest”, due to natural regeneration or tree planting. In such cases, if the land is not permanently converted to “forest”, there is no change in land use and the temporary presence of trees and forests on the land should not be considered “afforestation” or “reforestation” and the land shall not be considered to have converted to “forest”. The following guidance may be applied to identify temporarily stocked areas:

- 1) Areas of non-forest whose surface area, tree height, and canopy cover meet the definition of “forest” can be classified as “temporarily stocked” if there is enough information to ensure that the land will remain non-forest and maintain the average carbon stock of the non-forest class to which it belongs in the long term (i.e., for at least 10 years).
- 2) Removals associated with the temporary presence of trees shall not be considered in the construction of the FREL and monitoring of actual emissions during the jurisdictional or project crediting period.
- 3) Emissions associated with the removal of the trees after the period in which the land was “temporarily stocked” shall not be accounted for in the construction of the FREL and monitoring of actual emissions during the jurisdictional or project crediting period.
- 4) If after 10 years the presence of trees on the land continues to meet the definition of “forest” and there is no evidence that the land is managed as a class of non-forest (i.e. cropland, grassland, settlements, wetlands, other land and any of their sub-classes), the land should be considered to have been converted into “forest”.

Deforestation

Is the permanent conversion of “forest land” to non-“forest land” (i.e., cropland, grassland, settlement, wetland, or other land). The following applies:

- 1) Once an area of forest has been deforested, it cannot be deforested again during the jurisdictional or project crediting period.
- 2) Deforested lands are eligible for “afforestation” and “reforestation” 10 years after the deforestation event, but not before.
- 3) If a deforested area is reforested 10 or more years after the “deforestation” event and the afforested/reforested trees are subsequently permanently lost, the emissions associated to the loss of the trees shall be considered a reversal of the afforestation/reforestation activity and not an emission from “deforestation”.

Forest degradation

Is the long-term reduction (persisting for X years or more) of at least Y% the carbon stocks since time T in a forest due to human activities such as animal grazing, fuelwood extraction, timber removal or other such activities, but that does not result in the conversion of forest to non-forest land, and falls under the IPCC 2003 Good Practice Guidance land category of forest remaining forest. The following guidance should be applied:

- 1) The parameters “X”, “Y%”, and “T” shall be defined by the jurisdictional proponent taking into consideration the following:
 - X shall not be shorter than the duration of the historical reference period (i.e., \geq 4-6 years);

- Y% shall be significant at the 90% confidence level taking into consideration the uncertainty of the carbon stock change.
 - T shall not be earlier than the oldest date for which information on carbon stocks exists.
- 2) Decreases in carbon stocks and related emissions shall be accounted for only if they are a direct and permanent consequence of a change in forest management.
 - 3) Periodic changes in carbon stocks that occur within a forest management regime and that are not associated with a change in forest management should not be considered “*degradation*” and shall not be accounted under any REDD+ activity. The land shall be assumed to maintain its long-term (100 years) average carbon stock.
 - 4) If forest management is not sustainable and leads to a persistent, long-term, and progressive reduction in forest carbon stocks, the decrease in carbon stocks can be accounted for as “*degradation*” even if it is not attributable to a change in forest management. In such a case, the decline in carbon stocks can be accounted for in the construction of the FREL and monitoring of actual emissions only if it is persistent, i.e., not followed by long periods in which the forest recovers.
 - 5) Accounting of emissions from “*degradation*” requires monitoring of the carbon stocks at least once in every FREL validity period, i.e., at least every 4-6 years.

Enhancement

Is the long-term increase (persisting for X years or more) of at least Y% of the carbon stocks since time T in a forest due to a change in forest management such as the suspension of animal grazing, fuelwood extraction, timber removal or other. The following guidance shall be applied:

- 1) The parameters “X”, “Y%”, and “T” shall be defined by the jurisdictional proponent taking into consideration the following:
 - X shall not be shorter than the duration of the historical reference period (i.e., \geq 4-6 years);
 - Y% shall be significant at the 90% confidence level taking into consideration the uncertainty of the carbon stock change.
 - T shall not be earlier than the oldest date for which information on carbon stocks exists.
- 2) Increases in carbon stocks and related removals shall be accounted for only if they are a direct consequence of the change in forest management.
- 3) Periodic changes in carbon stocks that occur within the same forest management regime and that are not associated with a change in forest management should not be considered “*enhancement*” and shall not be accounted under any REDD+ activity. The land shall be assumed to maintain its long-term (100 years) average carbon stock.

- 4) Accounting of removals from “enhancement” attributed to a change in forest management requires monitoring of the carbon stock at least once in every FREL renewal period, i.e., at least every 4-6 years.

Afforestation and reforestation

Is non- “forest land” converted to “forest land” in which forest carbon stocks are increased through the planting of trees or the induction of natural regeneration by artificial means with the intention to create a forest plantation or restore the forest in the long term (i.e., at least 30 years). Lands that were “forest” less than 10 years before trees are planted or natural regeneration is induced are assumed to have been “temporarily unstocked”.

Guidance on how to consider LULC transitions in the construction of FRELS

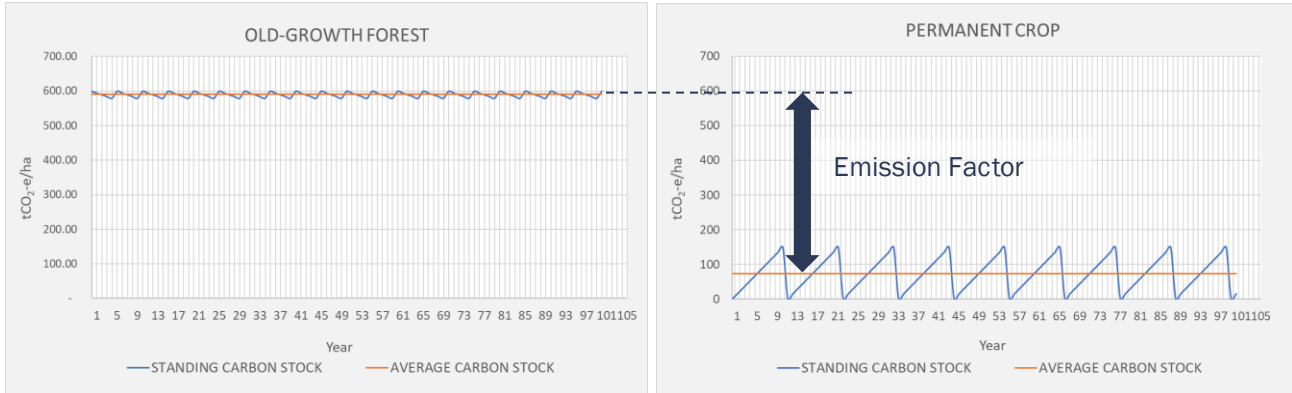
- 1) At least three Land Use / Land Cover (LULC) observations (points in time), i.e., two LULC-transition periods, must be evaluated during the historical reference period.
- 2) In all cases, except when the land is “temporarily unstocked” or “temporarily stocked”, in which cases no emissions shall be accounted for (for those temporary changes in carbon stocks),³ emission factors shall be calculated as the difference in carbon stocks from the LULC class existing at the beginning of the historical reference period and the LULC class existing at the end of the historical reference period, regardless of LULC changes that may have occurred in between, noting the following:
 - a) If the carbon stock of the LULC class existing at the beginning of the historical reference period is subject to periodical changes due to management activities such as thinning, harvesting, and replanting (i.e. in the case of forest plantations or natural forests that are periodically harvested) or due to periodical elimination and replanting of perennial crops and trees (such as in coffee and fruit tree plantations, agroforestry and silvopastoral systems, and shifting cultivation systems) the long-term (30 years) average carbon stock of this LULC class shall be considered in the estimation of emission factors.
 - b) If the LULC class existing at the end of the historical reference period accumulates carbon stocks in the first years following the LULC-transition and is subsequently subject to periodical changes due to management activities such as thinning, harvesting, and replanting or periodical planting, elimination and replanting of perennial crops and trees, the long-term (=100 years) average carbon stock of this LULC class shall be considered in the estimation of emission factors.
- 3) If the land at the beginning of the historical reference period is “forest” and at any subsequent time it is no longer “forest” – taking into consideration the exception of “temporarily unstocked” land – the land shall be classified as “deforested”.

³ Because the land remains in the same Land Use and is expected to recover the lost carbon in the short to medium term.

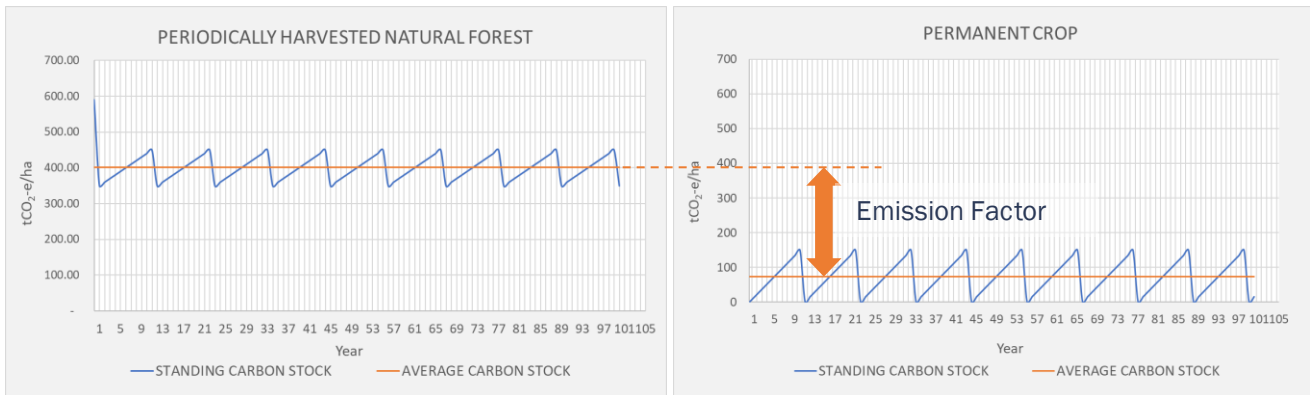
- 4) If the land remained “*forest*” without interruption during the historical reference period but a permanent change (loss) in carbon stocks occurred due to a change in forest management, the corresponding REDD+ activity will be “*degradation*”.
- 5) If the land remained “*forest*” without interruption during the historical reference period and, due to unsustainable forest management, the carbon stock shows a persistent, long-term trend of decrease, with no intermittent, long periods of carbon stock recovery, the corresponding REDD+ activity is “*degradation*”.
- 6) If the land remained “*forest*” without interruption during the historical reference period but a permanent change (gain) in carbon stocks occurred due to a change in forest management, the corresponding REDD+ activity will be “*enhancement*”.
- 7) “*Forest*” on which the decrease in carbon stocks is periodically compensated by carbon stock increases is not be subject to “*degradation*” and “*enhancement*”. Its carbon stock shall be estimated as the long-term average carbon stock.
- 8) If at the beginning of the historical reference period the land appears without a tree coverage that meets the definition of “*forest*” and at any point in time the land is subsequently and permanently converted to a “*forest*” through tree planting or induction of natural regeneration, the REDD+ activity will be “*afforestation*” or “*reforestation*” if the land was not a “*forest*” for at least 10 consecutive years prior to the establishment of the AR activity. Otherwise, the land should be considered as to have been “*temporarily unstocked*” and the corresponding REDD+ activity will be either “*degradation*” or “*enhancement*”, depending on the direction of the carbon stock change.

EXAMPLES

Example 1: Permanent conversion of a natural old-growth forest⁴ (“forest land”) to a permanent crop with periodical renewal of the woody biomass (non-“forest land”). Coffee plantation, fruit tree plantations, agroforestry and silvopastoral systems and shifting cultivation may be examples of this type of permanent crop. This LULC-conversion shall be classified as “deforestation”.

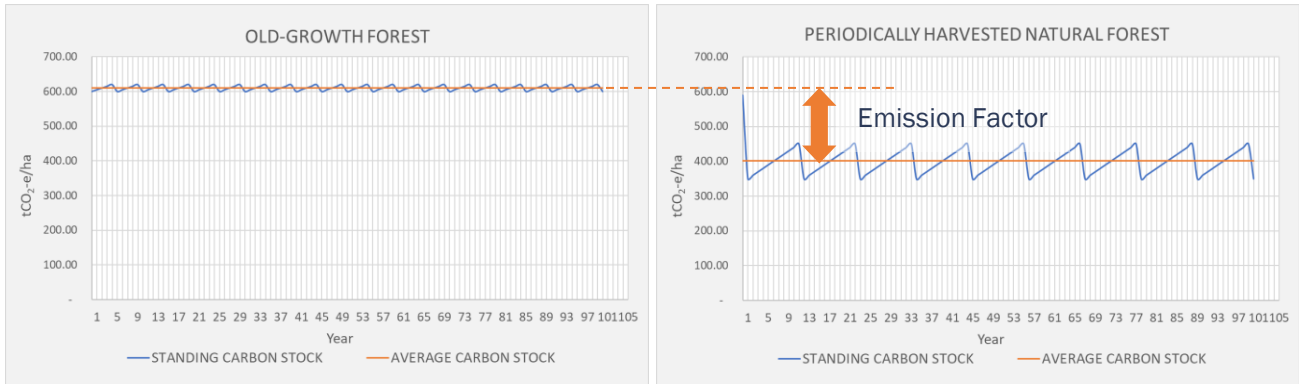


Example 2: Permanent conversion of sustainably managed (i.e. periodically logged) natural forest (“forest land”) to a permanent crop with periodical renewal of the woody biomass (non-“forest land”). This LULC-change shall be classified as “deforestation”.

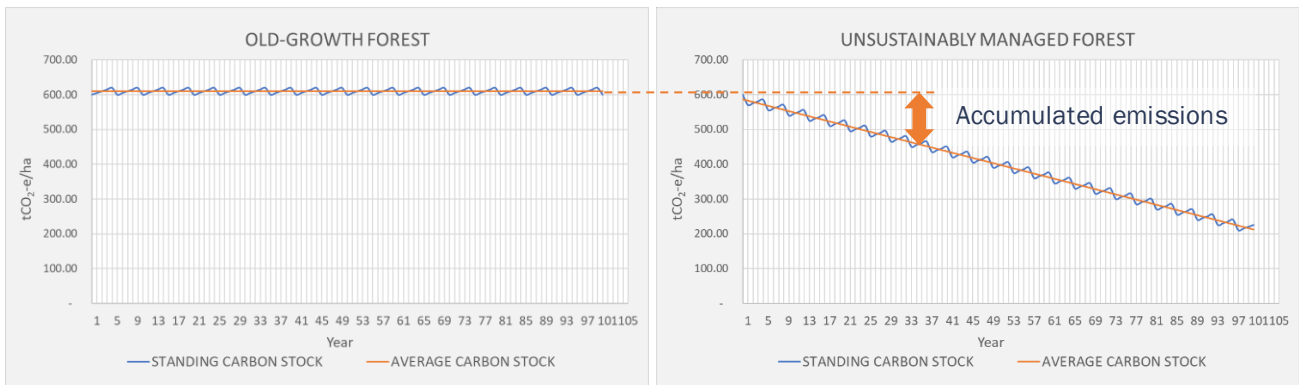


⁴ The up and downs of the standing carbon stock curve are the consequence of natural disturbances.

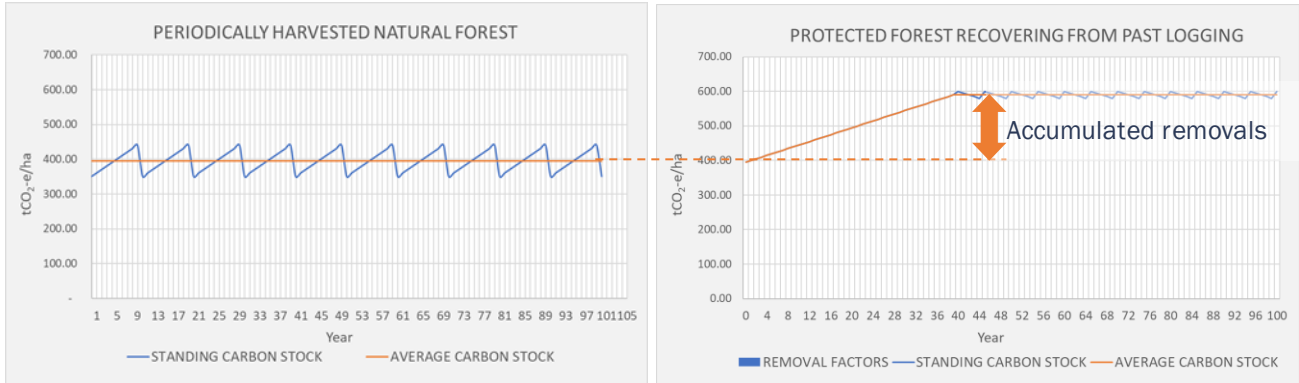
Example 3: Permanent conversion of a natural old-growth forest (“forest land”) to a sustainably managed (i.e. periodically logged) natural forest (“forest land”). This LULC-change shall be classified as “degradation”.



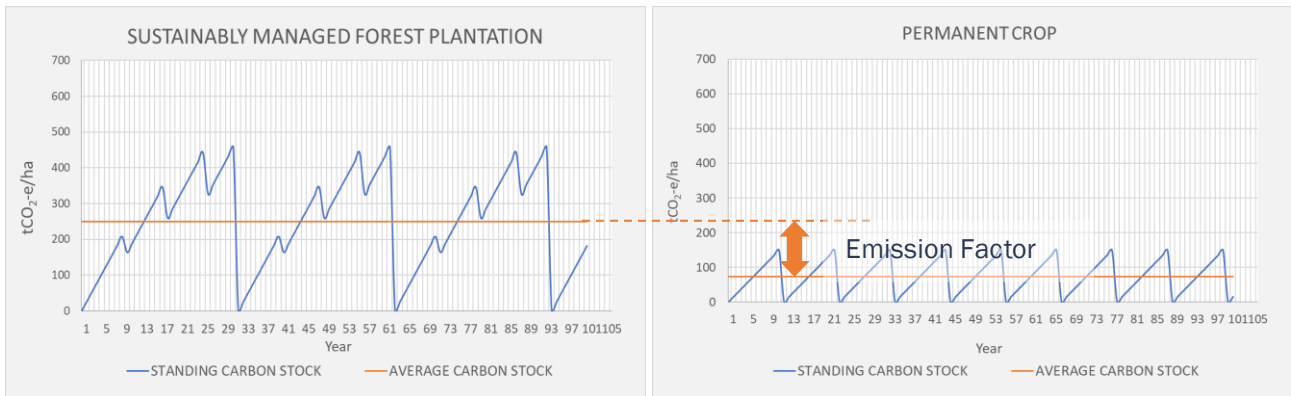
Example 4: Permanent conversion of a natural old-growth forest to an unsustainably managed (i.e. periodically over-logged) natural forest (“forest land” remaining “forest land”). This LULC-change shall be classified as “degradation” and the associated emissions are accounted for on an annual base, with monitoring of actual carbon stocks at least once every 4-6 years.



Example 5: Permanent conversion of a sustainably managed (i.e. periodically logged) natural forest (“forest land”) to a protected forest with logging suspension (“forest land”). This LULC-change shall be classified as “enhancement” and the associated removals are accounted for on an annual basis until the long-term average carbon stock of the protected natural forest is reached. Monitoring of actual carbon stocks should happen at least once every 4-6 years.



Example 6: Permanent conversion of a sustainably managed forest plantation (“forest land”) to a permanent crop with periodical renewal of the woody biomass (non-“forest land”). This LULC-change shall be classified as “deforestation”.



Example 7: Permanent conversion of a permanent crop (non-“forest land”) to “forest land” through “afforestation” or “reforestation”. Emissions and removals associated with the AR activity are accounted for on an annual basis until the long-term average carbon stock of the forest plantation is reached.

