

CDM-MP83-A08

Draft Methodological tool

TOOL30: Calculation of the fraction of non-renewable biomass

Version 03.0

DRAFT



United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), at its fifteenth session, acknowledged the work of the CDM Executive Board (hereinafter referred to as the Board) in reviewing methodological approaches for calculating emission reductions achieved by project activities that result in reduced use of non-renewable biomass (NRB) in households. Further, the CMP encouraged the Board to continue to review the methodological approaches referred to above, in particular with respect to the default baseline assumptions applied.
2. In response to decision 2/CMP.15, paragraph 8, the Board, at its 106th meeting, considered the concept note “Methodological approaches for calculating emission reductions from project activities, resulting in the reduced use of non-renewable biomass in households” and **requested the Methodologies Panel (MP) and the secretariat to facilitate and streamline the application of TOOL30 “Calculation of the fraction of non-renewable biomass”**. Where necessary, the MP shall propose improvements to TOOL30 and to related requirements of the methodologies citing the tool.
3. A call for public inputs on the draft revised methodological tool was open from 9 October to 23 October 2020. One comment was received.

2. Purpose

4. The purpose of this revision is to improve the TOOL30 in order to facilitate and streamline the application.

3. Key issues and proposed solutions

3.1. Potential areas for improvement of the TOOL30

3.1.1. Key issues and analysis

5. As per the decision of paragraph 58 from EB 90, default country-specific fNRB values¹ developed top-down by the Board have expired, except for two countries (Grenada and Haiti, which will expire by the end of this year). While the Board (EB 90) decided that SB procedures should apply for updating fNRB values and the Board (EB 97) adopted the “TOOL30: Calculation of the fraction of non-renewable biomass”, only four countries² have

¹ The list of countries is available at <<https://cdm.unfccc.int/DNA/fNRB/index.html>>.

² Uganda (ASB0002-2017), Rwanda (ASB0041-2018), Ethiopia (ASB0044-2019), Myanmar (TSB0015 under development).

- developed or are in the process of developing new default country-specific fNRB values using TOOL30, following the SB procedure.
6. According to the TOOL30, project participants have three options when determining fNRB values:
 - (a) Use a default value of 0.3; or
 - (b) Use default country specific values approved through the SB procedures, if available; or
 - (c) Calculate fNRB values for their own project activities/programmes of activities (PoAs) using TOOL30.
 7. A conservative default value of 0.3 for fNRB was included in the TOOL30 as an alternative means to estimate country/region/project area specific fNRB values. This had been proposed taking into account several studies, for example, 27-34% estimated by Bailis et al. (2015)³ and 41-43% estimated by Cashman et al. (2016)⁴.
 8. The calculation of fNRB values requires the collection of local data related to biomass consumption and production. In particular, obtaining the data for mean annual increment (MAI) of forest areas and other wooded land areas as well as the data on the extent of non-accessible areas has been indicated by stakeholders as a challenge.

3.1.2. Proposed solutions

9. Based on a number of clarifications recently approved by the Board (e.g. CLA_TOOL_0029, 0030, 0035, 0036, 0037, 0038, 0039) as well as the lessons learnt from developing/assessing standardized baselines and reviewing the fNRB values proposed in PDDs/PoA-DDs/Monitoring Reports applying the TOOL30, the Meth Panel recommends further improvements to the TOOL30 in the following areas:
 - (a) **Determination of MAI values:** since “2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories” and the latest Global Forest Resources Assessment have become available, the updated values should be used for calculation of MAI values. Specifically, the following sources may be considered:
 - (i) The latest data from the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories;
 - (ii) Global Forest Resources Assessment by the FAO.

³ Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. *Nature Climate Change*, 5(3), pp. 266–272, accessed at <http://www.nature.com/nclimate/journal/v5/n3/full/nclimate2491.html>. The study conducted an assessment of woodfuel supply and demand, and using 2009 as a base year, quantified the extent to which woodfuel demand exceeds supply. While the study provided a useful and comprehensive assessment of fNRB values at region/country level, it was observed that there are also limitations such as the input data on household woodfuel consumption used by the study is not up to date.

⁴ Cashman S, Rodgers M, Huff M, Feraldi R, Morelli B. Life Cycle Assessment of cookstove fuels in India and China. Washington, DC U.S. Environmental Protection Agency; 2016.

Also, in order to address the situation where no local data for MAI value is available in the country, additional guidance is provided in the proposed revision to the TOOL30.

- (b) **Determination of woody biomass consumption for energy and non-energy applications:**
- (i) Woodfuel (fuelwood and charcoal) consumption for domestic and non-domestic applications should be estimated either from consumption side or supply side, ensuring that there is no double counting;
 - (ii) When using inventoried volume (e.g. industrial roundwood) to estimate non-domestic woody biomass consumption for non-energy applications (e.g. construction, furniture) and for charcoal production, biomass expansion factor (i.e. ratio of aboveground oven-dry biomass of trees to oven-dry biomass of inventoried volume) may be used to consider the above ground biomass within trunks and branches. For other energy related use of woody biomass (e.g. use of fuelwood in ovens, boilers), whether it is used for domestic or non-domestic applications, the biomass expansion factor should not be allowed;
 - (iii) When estimating woody biomass consumption for energy and non-energy applications, the woody biomass exported to other countries (with deduction of imports) may be also added. If Illegal export is prevalent, it may be included only if the data is obtained through systematic data gathering and analysis providing adequate references.
- (c) **Setting a cap on fNRB values:** The MP also discussed how expectation from the Board to achieve conservative fNRB values could be met (EB90 paragraph 58, EB97 paragraph 27). Of the 97 PoAs in the pipeline for clean cookstoves, only 3 PoAs are using fNRB values below 0.6 and the vast majority of (more than 85) PoAs are using fNRB values above 0.8. In most cases the CMEs undertake the calculations of fNRB values as per paragraph 7(c) above. For many of these cases, the fNRB values which the CMEs applied for CPAs will be assessed at the time of issuance requests. Taking into account the lessons learnt from developing/assessing standardized baselines, and also looking into the range of country/region-specific values reported in the literature cited in paragraph 7 above, the MP is of the view that a cap for fNRB values, applicable to all countries may be desirable. Based on an analysis, MP proposed that a cap of 0.6 for fNRB may be set.

4. Impacts

10. Improvements in methodological approaches to the calculation of emission reductions for reduced use of NRB in households will facilitate the implementation of CDM project activities and PoAs in the household cookstove and water purification sector, which have strong relevance for least developed countries and other regions that are underrepresented in the CDM.

5. Subsequent work and timelines

11. The methodological tool is recommended by the MP for consideration by the Board at its 108th meeting. No further work is envisaged.

6. Recommendations to the Board

12. The MP recommends that the Board adopt this draft revised methodological tool, to be made effective at the time of the Board's approval.

TABLE OF CONTENTS	Page
1. INTRODUCTION	7
2. SCOPE, APPLICABILITY, AND ENTRY INTO FORCE	7
2.1. Scope	7
2.2. Applicability	7
2.3. Entry into force	7
3. NORMATIVE REFERENCES	7
4. PROCEDURE	7
4.1. Procedure to estimate consumption of woody biomass (H and $B_{old,total}$)	8
4.2. Procedure to estimate RB	10
5. MONITORING METHODOLOGY	11

1. Introduction

1. The methodological tool determines fraction of woody biomass that can be established as non-renewable biomass (fNRB).

2. Scope, applicability, and entry into force

2.1. Scope

2. This tool provides guidance and a step-wise procedure/method to calculate values of fNRB. The tool may be applied when calculating baseline emissions in applicable methodologies (e.g. AMS-I.E, AMS-II.G, AMS-III.Z, AMS-III.AV, AMS-III.BG, AMS-III.XX) for a project activity or a Programmes of Activities (PoA) that displaces the use of non-renewable biomass.

2.2. Applicability

3. This tool may be used by:
 - (a) DNAs to submit region/country-specific default fNRB values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or
 - (b) project proponents participants to calculate project or PoA-specific fNRB values.
4. For project or PoA specific fNRB values, proponents project participants shall assess the area where biomass is sourced and justify the selection of the area in CDM project design documents.

2.3. Entry into force

5. The date of entry into force is the date of the publication of the EB 102 # meeting report on ~~28 March 2019~~ DD Month 2020.

~~3. Normative references~~

- ~~6. This methodology refers to the CDM methodological tool "Project and leakage emissions from biomass".~~

4. Procedure

7. The shares of renewable and non-renewable woody biomass in the quantity of woody biomass consumption shall be determined following the requirements in steps described paragraphs below. Alternatively, a conservative default fNRB value of 0.3 may be used¹ as a country or sub-national value. In any case, the fNRB value determined shall be capped to a value of 0.6 when applying option in paragraph 3 (b) above. The fNRB values

¹ The default fNRB value of 0.3 may be used irrespective of the versions of the applicable methodology (e.g., AMS-I.E, AMS-II.G, AMS-III.Z, AMS-III.AV, AMS-III.BG, AMS-III.XX).

determined that are higher than 0.6 for fNRB would only be eligible under paragraph 3(a) by following the SB procedure.

8. The fraction of woody biomass that can be established as non-renewable, is:

$$fNRB = \frac{NRB}{NRB + RB} \quad \text{Equation (1)}$$

Where:

- fNRB = Fraction of non-renewable biomass in the country/region or project area (fraction or %)
- NRB = Quantity of non-renewable biomass (t/yr) in the country/region or project area, determined as per paragraphs 10 and 11 below
- RB = Quantity of renewable biomass in the country/region or project area, determined as per section 4.2 below (t/yr)

9. On a country- or region-specific basis, quantity of NRB shall be determined by calculating the total consumption of wood (H) in the country or region and then deducting the quantity of renewable biomass (RB) from it.

$$NRB = H - RB \quad \text{Equation (2)}$$

Where:

- H = Total annual consumption of wood in the absence of the project activity in the country/region/project area, determined as per section 4.1 below (t/yr)

10. On a project-specific basis, a value of fNRB can be derived by calculating the total woody biomass consumption used in the absence of the project activity ($B_{old,total}$) and estimating the potential supply of renewable biomass (RB).

$$NRB = B_{old,total} - RB \quad \text{Equation (3)}$$

Where:

- $B_{old,total}$ = Total annual consumption of wood in the project area in the absence of the project activity, as determined using the step wise procedure provided in the section 4.1 below (t/yr)

4.1. Procedure to estimate consumption of woody biomass (H and $B_{old,total}$)

11. Estimate the overall consumption of woody biomass, using one of the following options:
- Official statistics or reports or peer-reviewed literature;
 - Based on the number of households and other consumers of woody biomass in the country or region (H) or project area ($B_{old,total}$) as per the procedure in paragraph 12 or 13 below.
12. **Parameter** H is calculated using equation (4), accounting for all consumption within the country/region (not only wood fuel but also timber and industrial consumption). **Aggregated value** ($=HW_{region} \times N_{region}$) may be used in the calculation, if an official statistic

provides total household wood fuel consumption ($=HW_{region} \times N_{region}$) but does not provide disaggregated values for HW_{region} and N_{region} separately.

$$H = HW_{region} \times N_{region} + TI_{region} \quad \text{Equation (4)}$$

$$H = HW_{region} \times N_{region} + CE_{region} + NE_{region} \quad \text{Equation (5)}$$

Where:

HW_{region} = Average household wood fuel consumption, including fuelwood and charcoal in the country or region (t/yr/household)

TI_{region} = Non-domestic woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of wood in ovens, boilers etc.) and all woody biomass consumption for non-energy applications (e.g. construction, furniture) that are extracted from forests or land areas in the country/region for which the estimate of fNRB is to be made (t/yr)

CE_{region} = Commercial woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of wood in ovens, boilers etc.) that are extracted from forests or land areas in the country/region for which the estimate of fNRB is to be made (t/yr)

NE_{region} = All woody biomass consumption for non-energy applications (e.g. construction, furniture) that are extracted from forests or land areas in the country/region for which the estimate of fNRB is to be made (t/yr)

N_{region} = Number of households consuming wood fuel for thermal applications within the country/region (households)

13. For a project-specific area, $B_{old,total}$ is estimated using equation (5), based on the overall wood consumption in the area where the project is proposed.

$$B_{old,total} = HW_{project} \times N_{project} + TI_{project} \quad \text{Equation (6)}$$

$$B_{old,total} = HW_{project} \times N_{project} + CE_{project} + NE_{project} \quad \text{Equation (7)}$$

Where:

$HW_{project}$ = Average household wood fuel consumption, including fuelwood and charcoal in the project area (t/yr/household)

$TI_{project}$ = Non-domestic woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of wood in ovens, boilers, etc.) and all woody biomass consumption for non-energy applications (construction, furniture) that are extracted from forests or land areas in the project area for which the estimate of fNRB is to be made (t/yr)

$CE_{project}$ = Commercial woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of wood in ovens, boilers, etc.) that are extracted from forests or land areas in the project area for which the estimate of fNRB is to be made (t/yr)

$$NE_{project} = \text{All woody biomass consumption for non-energy applications (construction, furniture) that are extracted from forests or land areas in the project area for which the estimate of fNRB is to be made (t/yr)}$$

$$N_{project} = \text{Number of households consuming wood fuel for thermal applications within the project area (households)}$$

14. For the purpose of this tool, wherever charcoal is used for domestic or non-domestic applications, the corresponding quantity of woody biomass shall be determined using a default wood to charcoal conversion factor of 6 kg of firewood (wet basis) per kg of charcoal (dry basis)². Alternatively, credible local conversion factors (e.g. determined from a field study or literature) may be applied. However, the conversion factor should not be more than 8.
15. Woodfuel (fuelwood and charcoal) consumption for domestic and non-domestic applications should be estimated either from consumption side or supply side, ensuring that there is no double counting.
16. When using inventoried volume (e.g. industrial roundwood) to estimate non-domestic woody biomass consumption for non-energy applications (e.g. construction, furniture), biomass expansion factor (i.e. ratio of aboveground oven-dry biomass of trees to oven-dry biomass of inventoried volume) may be used to consider the above ground biomass within trunks and branches.
17. The biomass expansion factor shall **not** be applied to woody biomass used for domestic or non-domestic (e.g. use of fuelwood in ovens, boilers) energy applications, if the data is used to estimate the HW_{region} , $HW_{project}$ and CE_{region} , $CE_{project}$ parameters in the equations above.
18. Project participants/DNAs shall analyse to which extent by-products generated by the timber industry (sawmills, furniture plants, etc) are used for energy purposes and therefore reducing the direct extraction of fuelwood out of the forest.
19. Project participants/DNAs shall use 50% (default value) of the waste generated, (i.e. above ground biomass of trees less the inventoried volume) from the extraction of non-domestic woody biomass consumption for commercial purpose, for energy purpose, unless it is clearly demonstrated that such a waste is not extracted from the forest.
20. When estimating woody biomass consumption for energy and non-energy applications, the woody biomass exported to other countries (with deduction of imports) may be also added. Where Illegal export is prevalent, it may be included only if it can be shown that the data is obtained through systematic data gathering and analysis.

4.2. Procedure to estimate RB

21. The RB in the country/region/project area is estimated using the equation below.

² Refer to: <<http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref3.pdf>>. The term 'wet basis' assumes that the wood is 'air-dried' as is specified in the IPCC default table.

$$RB = \sum (MAI_{forest,i} \times (F_{forest,i} - P_{forest})) + \sum (MAI_{other,i} \times (F_{other,i} - P_{other})) \quad \text{Equation (8)}$$

Where:

$MAI_{forest,i}$	= Mean Annual Increment of woody biomass growth per hectare in sub-category i of forest areas (t/ha/yr)
$MAI_{other,i}$	= Mean Annual Increment of woody biomass growth per hectare in sub-category i of other wooded land areas (t/ha/yr)
$F_{forest,i}$	= Extent of forest in sub-category i (ha) ³
$F_{other,i}$	= Extent of other wooded land in sub-category i (ha) ²
P_{forest}	= Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within forest areas (ha)
P_{other}	= Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within other wooded land areas (ha)
i	= Sub-category i of forest areas and other wooded land areas ⁴

5. Monitoring methodology

22. The value of fNRB for the country/region or project area shall be calculated using either of the two following options:
- Ex ante:** the fNRB value is determined once at the validation stage, thus no monitoring and recalculation of the fNRB value during the crediting period is required;
 - Ex post:** the fNRB_y value is determined for the year “y” in the crediting period, requiring the fNRB value to be updated annually, following a consistent calculation procedure throughout the crediting period.
23. Cubic meters (m³) instead of tonnes (t) of wood may be used for estimation of fNRB values, as long as the same unit and the same conversion factor (e.g. wood density, moisture content) are consistently used for estimation of both woody biomass consumption (i.e. ~~HWregion and Tregion or HWproject and Tproject~~) and mean annual increment (i.e. $MAI_{forest,i}$ and $MAI_{other,i}$).

³ Forest and non-forest areas for which products or by-products are not available for meeting thermal uses as per AMS-I.E and AMS-II.G (e.g. commercial forests for plywood or for industrial use, or dedicated pastures or agricultural areas not accessible to woody biomass collection) may be excluded in this estimate, as long as the products and by-products of these areas are also not accounted for in the estimation of the consumption of biomass in Section 4.1 of this document.

⁴ Besides woody biomass from forest areas and other wooded land areas, DNAs or PPs shall also include woody biomass from other land areas that do not fall under the category of forest areas and other wooded land areas. Where any of potential sources of supply are not taken into account, it shall be justified.

24. In the case of ex-ante calculation of fNRB, the parameter fNRB shall be estimated using the most recent historical year for which data is available. In the case of ex-post calculation of fNRB, the parameter fNRB shall be estimated for the applicable year y of the crediting period. Where available, the same vintage of data should be used for all parameters applied in this tool to calculate fNRB. Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of fNRB).
25. If the fNRB value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of: i) total average above ground biomass tonnage of the area of forest areas deforested in recent past (t/ha), and ii) most recent available observed annual rate of deforestation (ha/y). If the estimated NRB value is more than 10% above the value calculated as per the product of biomass and deforestation rate, justification shall be provided for higher NRB.

Data / Parameter table 1.

Data / Parameter:	$HW_{region}, HW_{project}$
Data unit:	t/yr/household
Description:	Average household wood fuel consumption, including fuelwood and charcoal in the country or region. Average household wood fuel consumption, including fuelwood and charcoal in the project area.
Source of data:	Use one of the following options: (a) Approved standardized baselines valid for the country/region/area; or (b) Official statistics or reports or peer-reviewed literature; or (c) Results of a sampling survey conducted as per the latest version of "sampling and surveys for CDM project activities and programme of activities"; or (d) Default values adopted within CDM framework valid for the country/region/area (e.g. a default value of 0.5 tonnes/capita per year under AMS-II.G.). The most recent available historical data shall be used. However, the vintage of the above data shall not be before year 2000
Measurement procedures (if any):	-
Monitoring frequency:	-
QA/QC procedures:	If national studies or government data are used, cross-check the values with global data (e.g. Global Forest Resources Assessment by the FAO, UN data) and provide justification for any differences
Any comment:	-

Table 1. Data / Parameter

Data / Parameter:	$T_{region}, T_{project}$
Data unit:	t/yr

Description:	<p>Non-domestic woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of wood in ovens, boilers etc.) and all woody biomass consumption for non-energy applications (e.g. construction, furniture) that are extracted from forests or land areas in the country/region for which the estimate of fNRB is to be made.</p> <p>Non-domestic woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of wood in ovens, boilers, etc.) and all woody biomass consumption for non-energy applications (construction, furniture) that are extracted from forests or land areas in the project area for which the estimate of fNRB is to be made</p>
Source of data:	<p>For country or region, it may be determined through existing studies or government data or surveys.</p> <p>For the project area, it may be determined through surveys. The most recent available historical data shall be used.</p>
Measurement procedures (if any):	-
Monitoring frequency:	-
QA/QC procedures:	-
Any comment:	<p>The determination of mass or volume of "woody biomass" may be based on the above ground biomass within trunks and branches. Below ground biomass, twigs and leaves may be excluded in the calculations.</p>

Data / Parameter table 2.

Data / Parameter:	CE_{region}, $CE_{project}$
Data unit:	t/yr
Description:	<p>Commercial woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of wood in ovens, boilers etc.) that are extracted from forests or land areas in the country/region for which the estimate of fNRB is to be made.</p> <p>Commercial woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of wood in ovens, boilers, etc.) that are extracted from forests or land areas in the project area for which the estimate of fNRB is to be made</p>

Source of data:	<p>For country or region, it may be determined through existing studies or government data or surveys. The value for CE_{region} may be estimated by considering the consumption for energy applications by industries in the country, along with deduction of import and addition of export to other countries.</p> <p>For the project area, it may be determined through surveys. The most recent available historical data shall be used.</p> <p>It shall be demonstrated that there is no double counting in calculating CE_{region}, $CE_{project}$ values, some of which may be actually used for household purposes (e.g. production of charcoal used for households may be already counted under HW_{region}, $HW_{project}$). In case national studies or government data do not provide clear information to demonstrate that the values are only for commercial purpose and do not include household consumption, supporting evidence or an official letter of confirmation signed by appropriate government authority should be provided. In the absence of such evidence, the estimation of fuelwood and charcoal for energy applications in commercial sector shall be based on data on consumption estimates and not the supply of fuelwood and charcoal for energy as the latter is very likely to lead to double counting</p>
Measurement procedures (if any):	-
Monitoring frequency:	-
QA/QC procedures:	If national studies or government data are used, cross-check the values with global data (e.g. Global Forest Resources Assessment by the FAO, UN data) and provide justification for any differences
Any comment:	

Data / Parameter table 3.

Data / Parameter:	NE_{region} , $NE_{project}$
Data unit:	t/yr
Description:	<p>All woody biomass consumption for non-energy applications (e.g. construction, furniture) that are extracted from forests or land areas in the country/region for which the estimate of fNRB is to be made.</p> <p>All woody biomass consumption for non-energy applications (e.g. construction, furniture) that are extracted from forests or land areas in the project area for which the estimate of fNRB is to be made</p>
Source of data:	<p>For country or region, it may be determined through existing studies or government data or surveys. The value for NE_{region} may be estimated by considering the consumption for non-energy applications by industries in the country, along with deduction of import and addition of export to other countries.</p> <p>For the project area, it may be determined through surveys. The most recent available historical data shall be used</p>
Measurement procedures (if any):	-
Monitoring frequency:	-

QA/QC procedures:	If national studies or government data are used, cross-check the values with global data (e.g. Global Forest Resources Assessment by the FAO, UN data) and provide justification for any differences
Any comment:	The determination of mass or volume of “woody biomass” may be based on the above ground biomass within trunks and branches. Biomass expansion factor (i.e. ratio of aboveground oven-dry biomass of trees to oven-dry biomass of inventoried volume) may be considered for that purpose. Below ground biomass, twigs and leaves may be excluded in the calculations. Biomass expansion factor may be multiplied only with the amount of the woody biomass used for non-energy applications (e.g. construction, furniture).

Data / Parameter table 4.

Data / Parameter:	$N_{region}, N_{project}$
Data unit:	Number of households
Description:	Number of households consuming wood fuel for thermal applications within the country/region. Number of households consuming wood fuel for thermal applications within the project area
Source of data:	For country or region, it may be determined through existing studies or government data or surveys. For the project area, it may be determined through surveys. If the most recent available data for N_{region} or $N_{project}$ is only available for an earlier year than the year for which the estimation of fNRB value is done, then the historical annual population growth rate may be used to estimate the population value for the year for which the fNRB value is established. For example, if the latest available historical population data is 2015, it may be extrapolated, taking into account the historical annual population growth rate to calculate the population in 2018 (year in which the estimation of fNRB is being done)
Measurement procedures (if any):	-
Monitoring frequency:	-
QA/QC procedures:	-
Any comment:	When average household wood fuel consumption ($HW_{region}, HW_{project}$) is given in terms of average value per wood fuel user household, the number of households should be counted only for the households consuming wood fuel excluding the ones consuming other fuels

Data / Parameter table 5.

Data / Parameter:	$MAI_{forest,i}, MAI_{other,i}$
Data unit:	t/ha/yr
Description:	Mean Annual Increment of woody biomass growth per hectare in sub-category i of forest areas.

	Mean Annual Increment of woody biomass growth per hectare in sub-category i of other wooded land areas
Source of data:	<p>The following data source may be used:</p> <ul style="list-style-type: none"> (a) Global Forest Resources Assessment 2000 by the FAO for “Distribution of total forest area by ecological zone” (Table 14); and/or (b) 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories for “Above-ground biomass growth rates (t/ha-yr) for different ecological zones” (Chapter 4, Table 4.9). Use a weighted average based on the forest area of three two different age categories (i.e. primary forests, above and below 20 years secondary forests), if such data is available. Otherwise, use a simple average of the two age categories of secondary forests or a simple average of the three categories if primary forests exist; (c) Global Forest Resources Assessment (e.g. Table 17 “Net annual increment in forest 1990-2015” in 2015 version); (d) National studies or government data or official statistics. <p>The most recent available data shall be used. However, the vintage of the above data shall not be before year 2000.</p> <p>It is required to determine MAI values for different sub-categories of forest areas and other wooded land areas. However, in the absence of the local data in the country, global data (such as 2019 Refinement to 2006 IPCC Guidelines) or data of similar ecological zones in other regions may be used with due justification.</p> <p>Further, if the MAI value for other wooded land areas is not available in a country while only the MAI value for forest areas exists, the MAI value for forest areas may be used as the MAI value for other wooded land areas with due justification</p>
Measurement procedures (if any):	-
Monitoring frequency:	-
QA/QC procedures:	If national studies or government data or official statistics are used, compare values with FAO and IPCC defaults and provide justification of differences
Any comment:	Mean Annual Increment (MAI) and Mean Annual Change (MAC) are two different concepts. The Annual Change in Growing Stock (m ³ /ha/year) should not be considered as MAI. In the context of TOOL30, the MAI expresses the production potential of a land area to deliver woody biomass, and it should be understood as an average quantity of woody biomass produced per hectare of forest areas or other wooded land areas during one year of growth (m ³ /ha/year) or (tonnes/ha/year). The MAC, understood as net change in growing stock of total forest area, can be negative if there is a net reduction in the growing stock in a given year, say in the case of deforestation; however, the MAC is not used in the equations of TOOL30

Data / Parameter table 6.

Data / Parameter:	$F_{forest,i}$, $F_{other,i}$
Data unit:	ha
Description:	Extent of forest in sub-category i Extent of other wooded land in sub-category i
Source of data:	The following data source may be used: (a) Global Forest Resources Assessment 2015 by the Food and Agriculture Organization of the United Nations (FAO); (b) Official statistics; (c) Project-specific survey data. If the value of fNRB is calculated for a project area for the year “y”, and during this year a decrease in the forest area is projected to occur, the extent of the forest area available to provide woody biomass to the users can correspond to the forest area (hectares) at the beginning of the year “y”, or the average of the values of the forest area at the beginning and at the end of the year “y”
Measurement procedures (if any):	-
Monitoring frequency:	-
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 7.

Data / Parameter:	P_{forest}, P_{other}
Data unit:	ha
Description:	Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within forest areas. Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within other wooded land areas

Source of data:	<p>The following data source may be used for the data on protected area:</p> <p>(a) Global Forest Resources Assessment 2015 by the Food and Agriculture Organization of the United Nations (FAO)</p> <p>(b) National studies or government data or official statistics.</p> <p>The most recent available data shall be used.</p> <p>To define “geographically remote area”, DNAs/PPs may consider proximity to roads or rivers. For example, forests/other wooded lands that are beyond the average distance travelled to collect firewood can be considered non-accessible. The information of the average travel distance may be sourced from national studies or peer-reviewed literature, or surveys in the project area.</p> <p>All areas that are accessible to either the forest industry or to individual households are considered to be “accessible”. Therefore, wood extraction by the forest industry and fuelwood collection by individual households should both be considered when estimating the “non-accessible areas”</p>
Measurement procedures (if any):	-
Monitoring frequency:	-
QA/QC procedures:	-
Any comment:	Consideration of this parameter is optional. If DNAs or PPs wish to consider non-accessible areas, they shall provide justification

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	17 November 2020	<p>MP 83, Annex 8</p> <p>To be considered by the Board at EB 108.</p> <p>The draft version of this document (CDM-MP83-EC02-A03) was available for public input from 9 to 24 October 2020. It received one input.</p> <p>Revision to streamline the application of this tool.</p>
02.0	28 March 2019	<p>EB 102, Annex 7</p> <p>Revision to:</p> <ul style="list-style-type: none"> • Provide options of data sources for parameters, which could be used by DNAs and project participants to establish an fNRB value; • Clarify the requirements on the data vintage for parameters used in the calculation of fNRB values.

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	1 November 2017	EB 97, Annex 9 Initial adoption.

Decision Class: Regulatory

Document Type: Tool

Business Function: Methodology

Keywords: biomass, fraction of non-renewable biomass, wood products

DRAFT