CLEAN DEVELOPMENT MECHANISM

CDM-MP95-A04

Information note

Stakeholder inputs on development of default values for fraction of non-renewable biomass

Version 01.0

United Nations
Framework Convention on
Climate Change

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1. Stakeholder inputs

1. A total of 28 responses were received as shown in Table 1[1].

2. The secretariat paraphrased and grouped the information in the submissions to create a synthesis for better readability and overview. In this process, despite the best efforts, some relevant information may have been unintentionally omitted or not correctly represented. Additionally, it was challenging to fit certain information within the designated categories. Readers are encouraged to consult the original submissions (see footnote 1) to understand fully the background and context in which proposals are made in the submissions.

3. In-text citations in this document use acronyms (e.g. CE) to facilitate easy access to the original submissions. Those submitters from the first call for public input (annex 4 to MP 94 meeting report) that have commented again in this second call for public input, have the same acronyms (LU, BLE, CCA, PM, TASC, DAH, BURN, UEG, FMC) as in the first such Info Note referred above. 18 submissions to the second call are from new submitters.

Table 1. List of stakeholders who responded to the call for public input

No.	Submitter	Stakeholder
1	Rahul Rai	Rahul Rai (RR)
2	Josh Goralski	Unlocking Communities (UC)
3	Thomas Fisterwald	Foundation myclimate (FMC)
4	Jessica Wade-Murphy de Jimenez	Atmosphere Alternative (AA)
5	Loic Braune	Loic Braune (LB)
6	Edwin Cogho	TASC (TASC)
7	Rory McDougall	DelAgua Health Rwanda Ltd. (DAH)
8	Sam Ngangi	Sam Ngangi (SN)
9	Evan Haigler	Impact Carbon (IC)
10	Elisa Derby	Clean Cooking Alliance (CCA)
11	Pedro Carvalho	Ecosecurities Swiss Sarl (ESS)
12	Ulla Mauno	South Pole (SP)
13	Esther Adams	Proyecto Mirador (PM)
14	Sven Kolmetz	Project Developer Forum (PDF)
15	Victor Costenoble	Victor Costenoble (VC)
16	Channabasava Parit	Channabasava Parit (CP)
17	Eduardo Baixo	Eduardo Baixo (EB)
18	Samir Thapa	Loughborough University (LU), MECS

[1] Detail of the call for public input and the full submissions are available at https://cdm.unfccc.int/public_inputs/2024/202406/index.html.

No.	Submitter	Stakeholder
19	Rajesh Sundaresan	Carbon Impact Capital Pte. Ltd. (CIC)
20	Tom Hills	SCB Environmental Markets SA (SCB)
21	Anantha Karthik Rajagopalan	UpEnergy Group (UEG)
22	Molly Brown	BURN Manufacturing (BURN)
23	Jonathan Norton	Vitol (VL)
24	Raphael Eberle	Sistema.bio (SB)
25	Matteo Massa	KTH Royal Institute of Technology (KTH)
26	Nicolas Fouassier	Pamoja Mocambique LDA (PML)
27	Erik Wurster	BioLite Energy (BLE)

2. General comments

4. Below is a summary of general public inputs received. (UC, TASC, SB, DAH, SP, PDF, CP, UEG, BLE, EB, BURN, SCB)

5. Give Fair Consideration to Island Nations: Island nations like Haiti are often excluded from various development initiatives due to their smaller populations, but given the level of need, they deserve the same level of consideration as regions in southern Africa. (UC)

6. Country Approval: While we welcome the increased sophistication of fNRB estimation, the Modeling Fuelwood Saving Scenario (MoFuSS) model presented is complex. Neither the model nor the data inputs have been adequately validated by Designated National Authorities (DNAs) due to the short timeframe provided for analysis. Proposed Change: The determination of the fNRB deserves critical scientific consensus before final values are released. The current 5-week review period provides little room for sufficient stakeholder engagement and inadequate time for DNAs to assess and provide comprehensive feedback on the input and results accuracy. We urge the CDM Executive Board to delay the implementation of the new fNRB estimates until a broader scientific consensus is achieved. This will ensure the integrity and accuracy of the environmental claims, aligning with ISO standard ISO 5725-1:1994, which emphasizes accuracy over conservativeness in scientific guidelines. (TASC, SB, DAH, SP, PDF, EB, BURN, SCB)

7. Results: There continue to be material and substantial concerns with the calculation of the fNRB results across Africa with concerns raised by a variety of stakeholders. As such, it would be inappropriate to approve these numbers without a further round of consultation. Schedule a third public round of consultation. (DAH, SCB)

8. Results: From speaking with various stakeholders, the default values under the MoFuSS model are incorrectly perceived as the set fNRB by country when that was never the intention and that national level inputs should be applied in addition. The UNFCCC should make clear in all external communication that the default values from the MoFuSS model is a basis for calculating fNRB and that Host Countries and project developers should apply their own, evidence-based inputs into the model to calculate an accurate fNRB. The UNFCCC should also release a statement clarifying this. (DAH, SCB)

9. The output value from the project implies that in most of countries, the clean cooking technology is not financially viable, in other words, clean cooking will not have significant impact in reducing the GHG emissions. (CP)

10. We understand that the MoFuSS developers are working on a cloud-based version of MoFuSS that will allow PDs to develop their own models using the respective country and project specific inputs. UpEnergy Group would request the researcher's team to throw some visibility on the timeline by MoFuSS cloud version will be open for public. Requesting UNFCCC and the lead researchers to organize a comprehensive workshop for the project developers to impart the technical know-how of the MoFuSS tool. (UEG)

11. We would recommend to extend the timeline for the stakeholder consultation process to enable participation of boarder audience including Project Developers, National Designated Agencies (NDAs) and Governmental bodies from Host Counties, Academicians, NGOs etc. (UEG, BLE)

3. Clarifications requested

12. Below is a summary of Clarifications Requested. (AA, TASC, SB, ESS, SP, PM, PDF, CP, LU, CIC, EB, BURN).

13. Para No. 7b (3-4) - "However, we discovered that this led to growth rates that observed standing stocks of biomass in two of the 680 land-cover categories." This sentence does not make sense, and it is very important to understanding the change. Please clarify. (AA)

14. Para No. 9 (5-6) - "Employing decadal intervals to report data is a conservative approach (towards higher values of fNRB)..." - a conservative approach in the CDM context would be tending toward LOWER values of fNRB. Clarify - does employing decadal intervals, as has been done, tend toward higher or lower fNRB values? I.e. is the method applied unconservative, or conservative? (AA)

15. Para No. 10 - What information or data sets could help to improve the certainty of the revegetation rates (growth rates)? What data input or cross-check could lower the uncertainty on this input for the case of a model run for a specific, individual project area? (AA)

16. Para No. 49 & 64 - How is altitude of terrain taken into account in harvesting likelihood? (AA)

17. In particular, please advise on opportunities for stakeholder engagement on this issue after September 2024. What happens to this feedback when the transition from the CDM to the Article 6.4 SB happens? (TASC, SB, SP, PDF, EB, BURN)

18. Para 64 (Section 2.15.2): The paragraph mentioned that the model increases the friction by 90% for this assessment. We would like to know what the basis is for selecting 90% friction in protected areas because the source was not identified in the report. As we understood, for local inhabitants, the access to protected areas could vary greatly. We believe this should be also a factor for a methodological requirement, treated on a project/VPA scenario and should not be included in the general tool. We ask for the report to clearly provide the reference of this 90% increase. We propose for UNFCCC to consider this friction as a factor for a methodological requirement, treated on a project/VPA scenario and should not be included in the general tool such as this assessment. (ESS)

19. Para 69 (Section 2.15.4): As mentioned in the other paragraph that this model is also meant to be used publicly, we question how the demonstration of “prune” factor can be done by project developer later on. We propose for UNFCCC to provide clear guidance on the prune factor determination for project to use in the future model of the MoFuSS that is open-access and cloud-based. (ESS)

20. Table 5 (page 31): The table show the Standard Deviation that are derived from variance of NRB and fNRB resulting from Monte Carlo simulation. However, it is not clear how the Monte Carlo simulation determines which NRB and fNRB that are selected for the table. As an example, it is not clear how the choice of fNRB of 5% for Indonesia with an SD of 100% is selected to be presented. The justification of using 5% as a conservative number is not well informed in the table nor in the paragraph. We ask for the report to provide transparent process and clear justification on how the Monte Carlo simulation selected these NRB and fNRB values in Table 5. (ESS)

21. 2.6 Biomass growth functions, Para 29 - Biomass Growth Functions: The growth function to simulate woody biomass divides AGB by the variable Kj (carrying capacity). Does dividing by total carrying capacity, as a maximum value, introduce an overly conservative variable? Assess whether Kj should be adjusted for marginal harvest. (SP, PDF).

22. 2.6.1 SOC, para 35 - Soil Organic Carbon (SOC): The default values do not include the option to include dead wood due to land clearance. How significant is the impact of those values, if incorporated? Assess sensitivity and consider whether dead wood for land clearance should be accounted for as a default adjustment to fNRB. (SP, PM, PDF, EB, BURN)

23. 2.15.4 Prune factor, Para 69 - Prune factor: What is the sensitivity of the "prune factor" and how is it determined that 100% is the right value? Add note explaining sensitivity of the effect of prune factor on fNRB values and a justification of the value chosen. (SP, PDF, EB, BURN)

24. Para 68 Prune factor – the pattern and probability of woodfuel harvesting may be totally random or more managed depending on the type of forests, local management practices – for regional it is 100% assuming all pixels are visited at least once over the period whereas for subnational it is less than 100%. Though its influence is comparatively less - looks like a high level of assumptions which may not be true and contradicting previous understanding of manged harvesting. Make changes as required based on robust evidence. (LU)

25. Could you please clarify the rationale behind using 2010 as the base year for calculations, despite concerns about rapid population growth and urbanization since then? Would it be more accurate to utilize the most recent country-specific data instead? (CP)

26. Why is there a suggestion to include trees outside the forest from fNRB calculations? How might this inclusion impact rural communities that rely on wood sourced specifically from forests? (CP)

27. How can project participants more effectively estimate values without relying on default assumptions? Are there specific nationally available reports or data sources recommended for this purpose? (CP)

28. Table 4 - Are the woodfuel values used for assessment correct, for South Asia and SSA, its 0.4 ODT/person-year which is different to Table 3 based on global datasets from

CDM projects and UN/DHS value. Is the UN value oven dry weight? Estimate with the corrected values if this is not a typo. (LU)

29. Table 4 - Should we differentiate the quantity of fuelwood and charcoal consumption between urban and rural residential and non-residential entities. Will this differentiation influence the results, in addition to estimating urban fNRB and assuming that urban consumption being fulfilled by the high fNRB rural areas. May be good to make changes if these considerations are significant. (LU)

30. Outputs don't align with common sense: The output of the model seems to conflict with common sense. For instance, see below comparison of map derived from MoFuSS with a satellite map of the same region from Google. MoFuSS Map of India v/s Google Map of India: As per the proposed MoFuSS model, the less the forest cover the lower is the fNRB value - as those areas are termed "sustainable". Desert areas in the western part of India or rain starved and financially backward central parts of India (with high fuelwood usage for cooking) have 0-10% fNRB, while the greener North-Eastern parts with highest forest cover, rainfall, and availability of biomass have the highest fNRB!! The presumed logic (not clarified by the authors of the model), is that somehow biomass demand in areas starved off biomass has fallen to such a low a level that it has achieved equilibrium in those regions. Common sense dictates that projects that support biomass preservation in areas starved off biomass are likely to be more impactful/valuable, similar to doing an SDG2 project to feed population in areas where people are starving or doing an SDG1 project in locations where poverty is high or doing and SDG6 project where there is a shortage of water. However, the results of the proposed methodology seem to suggest the exact opposite. It penalizes projects in desert/barren areas and reward projects in very fertile areas. This is equivalent of rewarding SDG2 projects in areas where people consuming over 3000 calories a day and penalising those done in areas where people consume just 600 calories a day, with the assumption that somehow people have found a "balance" between demand and supply of food. Similar logic, if applied to other UN SDGs would lead to significantly different outcomes than what the UN SDGs seek to achieve. If the results of the model don't make sense for the country with the largest population in the world, containing the largest number of people requiring interventions in terms of clean cooking and biomass protection, how can the model be trusted? How do we draw comfort that this is not a literal case of "missing the forest for the trees"? How does UNFCC propose to explain these to any concerned stakeholder, media, or public at large? (CIC).

4. fNRB Methodology

31. Below is the summary of public inputs received related to "fNRB Methodology". (UC, LB, TASC, SB, SN, IC, CCA, SP, PM, PDF, VC, CIC, UEG, BLE, EB, BURN)

32. Provide a Simple Explanation of fNRB Methodology: A clear, layman-friendly explanation of your methodology to develop the fNRB values on your website would specifically help potential debt financing parties understand fluctuations in the market. At present, many of our potential funders (especially those willing to finance our subsidy-based model at 3-5%, which would allow for the majority of carbon credit payments to flow to communities) do not have enough experience dealing with carbon credits to understand why the values have changed or the rationale why these values are the best to date. Without that understanding, these parties find such projects too risky in the U.S., particularly in light of recent news delegitimizing carbon offsets. (UC)

33. The paper should clarify that the approach and definitions it uses to calculate fNRB are incompatible with the methodologies stating that "Emission Reductions = fNRB x Displaced Emissions". This paper could make it more explicit that: 1. the non-renewable biomass is what is consumed in excess of a threshold. As such, one ton above the equilibrium threshold is 100% non-renewable, and similarly, as long as the harvesting is higher than the production of the landscape, one ton less should be considered 100% emission reduction; 2. the fNRB is not the same in the scenario with project because the landscape is less harvested, therefore fNRB is reduced (i.e. the landscape becomes closer to the sustainable equilibrium). 3. The system used for assessing the emission is the landscape, not the household. When a project reduces emission for some households, it frees renewable biomass for the households in the same landscape but outside of the project. The variation of their emissions is not accounted in the current methodologies As this paper is very clear on the definition of fNRB, it proves that this definition is incompatible with the narrative and definition of fNRB used in CDM AMS-II.G., Gold Standard Reduced emissions from Cooking and Heating (also known as TPDDTEC) and VCS VMR-0006 and other similar methodologies. The Technical paper attached below proves that – to remain coherent with the definition of fNRB provided in MoFuSS – the Emission Reductions in a clean cooking project should NOT be fNRB x displaced emissions. (LB)

34. We noted that, from the paragraph 14, fNRB was defined as such: "Trees grow naturally in many environmental conditions and if wood is harvested at or below the rate at which it naturally regenerates, then harvesting is sustainable. However, if more wood is harvested than the landscape can replace, as is often the case in low- and middle-income countries (LMICs) where people rely heavily on fuelwood and charcoal, harvesting is not sustainable and tree cover will decline over time. This causes landscape degradation and may also contribute to long-term deforestation. fNRB is a measure of the relative amount of wood that is harvested above the landscape's natural rate of regeneration." This is consistent with the previous definition of fNRB. However, this definition is inconsistent with the approach used in most of the methodologies that consider fNRB as the fraction of each unit of emissions that come from non-renewable source. With the definition in this paper, if a country/district/landscape would reduce harvesting to the sustainability threshold (equilibrium), the emissions should be reduced by 100% - as, per the definition above – harvesting would then be sustainable. Yet, according to paragraph 16 and 17, the concept of fNRB is used broadly by methodologies, and, for all of them, it is considered that a reduction of harvesting of "h" would lead to an emission reduction proportional to fNRB x "h". With this approach, in the example above, reducing harvesting back to the equilibrium would not reduce emission by "100% x displaced emissions" but by fNRB x "displaced emissions". This paradox shows that there is an incoherence between the definition and calculation of fNRB and the use that is made in the methodologies. (LB)

35. fNRB as a marginal variable: Members of the PD Forum have been exploring a marginal approach to fNRB which we believe warrants further exploration. At present the MoFuSS model considers the non-renewability of the total harvest across a landscape, but we suggest that fNRB should instead consider the non-renewability of a reduction in harvest. This would bring cookstove carbon crediting in line with the emission reduction approach in energy efficiency projects where the methodology (e.g. AMS-II.C.) uses a marginal grid emission factor. We strongly recommend that the CDM EB assess the marginal approach to fNRB, with a view to bringing cookstove methodologies in line with the approach to grid emission factors in AMS-II.C. We recommend that this work is conducted as part of the review of these numbers, and before the conclusion of this workstream at the Executive Board in November. Funding should be provided for MoFuSS to be re-run in an

'intervention' scenario, for 2020-2030, based on a Paris-aligned clean cooking adoption curves. Only fNRB defaults that are calculated based on the delta between baseline and intervention scenario should be published. Baseline fNRBs should not be published, and the timeline for adopting new variables should be extended. The benefits of a more scientifically accurate approach to fNRB outweigh the delay. (TASC, SB, SP, PDF, EB, BURN)

36. 2.14 Calculating fNRB, Para 14 - Calculating fNRB: The document defines that "real emission reductions are only attributable to the fraction of harvested wood that would not have regenerated naturally." However, the fraction of the forest that is included in the calculations should be adjusted to account for the probability that marginal forest areas are tapped first for fuelwood. Allow the possibility to discount total forest area to account for marginal harvest. (TASC, SB, SP, PDF, EB, BURN)

37. Marginal vs. Average fNRB Debate: The article highlights an ongoing debate between using a marginal approach, which assumes savings in wood consumption primarily reduce the unsustainable portion of the harvest, and an average approach, which does not differentiate between renewable and non-renewable components of biomass savings. The choice of methodology can significantly impact the calculated fNRB and, consequently, the articled emission reductions. The lack of consensus on which approach is more accurate presents a challenge for the consistent application of fNRB in emission reduction calculations. (SN)

38. Transboundary Trade and International Dynamics: The treatment of transboundary trade and its impact on national and regional fNRB calculations is another area of concern. The current methodology may not adequately account for the complexities of international trade in woodfuels, which can significantly alter the balance of supply and demand and, consequently, the calculation of fNRB. (SN)

39. 2.1 What is fNRB? Para. 14: "…if more wood is harvested than the landscape can replace…, harvesting is not sustainable and tree cover will decline over time." Clarifying question: In calculating fNRB should (or does) MoFuSS account for biomass growth potential above and beyond the replacement rate? If, for example, there is potential for tree cover to increase by 1% per year, should fNRB account for the delta between tree cover decline and potential tree cover growth of 1% above replacement, rather than the delta between tree cover decline and the replacement rate exclusive of potential growth. If MoFuSS is calculating fNRB based on the amount of wood harvest beyond what the landscape can replace, should it instead be calculating fNRB based on the amount of wood harvest beyond what the landscape grow/increase above replacement? In other words, should the increment of potential growth above replacement also be included in fNRB calculations alongside losses below replacement. (IC)

40. Marginal fNRB: Recommendation: Reevaluate the fNRB calculation methodology to consider fNRB as a marginal variable. This would involve adjusting the MoFuSS model to reflect the non-renewability of marginal reductions in harvest rather than the total wood stock. Proposed Actions: • Initiate further studies to explore the potential impacts of adopting a marginal approach to fNRB; • Re-run the MoFuSS model for the period 2020-2030, using intervention scenarios aligned with Paris Agreement goals on clean cooking practices, to develop new marginal fNRB defaults; • Ensure that published fNRB defaults reflect the difference between baseline and intervention scenarios. (IC)

41. In addition, consider commissioning an evaluation to determine whether viewing fNRB in terms of marginal (vs. national) calculations would generate more accurate fNRB estimates. (CCA)

42. The forest area that is included in the calculations should be weighted to account for the probability that marginal forest areas are tapped first for fuelwood. As written, MoFuSS methodology runs the risk of underestimating the carbon intensity of fuelwood. Further exploration and peer-reviewed research is required to determine the extent to which MoFuSS underestimates carbon intensity by failing to consider marginal harvest. Without executing this research, it is unknown whether MoFuSS errs so far on the side of conservatism that it should be considered inaccurate. Defaults should not be implemented until marginal harvest is properly accounted for. (PM)

43. The model used for calculating the fNRB is not questioned as it is understood that it is based on the latest science and available data, including expert's feedback for revision. However, the application MoFuSS derived values for cookstove methodologies as they are presented is not compatible and rely on different definitions and interpretations of fNRB parameter. As described in the comment and more extensively in the paper below: it should be clearly defined in the MoFuSS paper that those fNRB values cannot be used directly in carbon methodologies unless a change in the definition of the project scope is defined. In theory, as long as the sustainability equilibrium has been reached (H=RB, e.g. derived through MoFuSS) any reduction of consumption tackles the overconsumption at first. This would lead to 100% of associated issuances (no fNRB discount until sustainability equilibrium). (VC)

44. A fundamental logical flaw with significant adverse consequences for climate action: The fNRB concept and application appears to have a significant fundamental error which can be illustrated with a simplified example: Let's assume a geographical area has 100tpa of biomass demand and 90tpa of new/incremental biomass supply resulting in 10tpa of unsustainable consumption. If an organization involved in climate action introduces an energy efficiency technology that reduces demand by 10tpa, the region would have achieved a sustainable equilibrium. Instead of rewarding the actor 10tpa of credits, the proposed methodology would result in only a 1tpa credit (10tpa x 10% fNRB), which makes no logical sense. The correct, and simpler, approach would be to ensure the organization gets credits for actual emissions reduction achieved or 10tpa demand-supply gap, whichever is lower. If the organization achieves 30tpa, their credits should be limited to 10tpa. Therefore, i) Upto 10tpa of emissions reductions in that region, total credits should be lesser of emissions reduction achieved or 10tpa demand-supply gap ii) Beyond 10tpa of emissions reduction, credits should be zero. Instead of the above, the proposed methodology would result in just 1tpa credit for every 10tpa of climate action. Severe dis-incentivisation of climate action is not the outcome that UNFCCC should be supporting, as they will only make it tougher to achieve the UN SDGs. To overcome this severe disincentive, in the above example, prices of certified emission reduction units using this proposed methodology would need to rise 10x from current levels to justify the project, which is both unlikely and not desirable. Also, this violates clause a iii) in Page 25 of https://cdm.unfccc.int/Reference/COPMOP/08a01.pdf#page=6 which states that Provide rigour to ensure that net reductions in anthropogenic emissions are real and measurable, and an accurate reflection of what has occurred within the project boundary; The methodology needs to ensure accurate reflection, and not an illogically low number. One more point to note here is that low fNRB is not 'conservative' as the model appears to assume, as it contributes fairly aggressively to increase cost of climate action and

disincentivises development of new emission reduction projects, as illustrated in the example above. (CIC)

45. Our Recommendations to research team is to include the marginalization module in MoFuSS tool to accurately capture the climate impact created by the clean cooking and safe water projects and also to assess the real forest cover change scenario. A stakeholder consultation meeting can be conducted by inviting various SMEs from Global South, academicians, Carbon PDs etc. to brainstorm the concept of marginality and eventually to include this feature in the MoFuSS tool. (UEG, BLE)

5. TOOL 30: Revisions and proposed changes

46. Below is the summary of public inputs received related to “TOOL30”. (UC, FMC, TASC, SB, CCA, SP, PM, PDF, EB, BURN).

47. We recently learned about TOOL30 while filing, but the data required to model TOOL30 is, at best, incomplete, leading to an inaccurate fNRB estimate of around 30-40%, which jeopardizes the viability of our subsidy. However, based on our lived experiences on the ground, we believe the actual figure is closer to 96%. We do not want to claim credits without supporting data, but we also have an obligation to ensure that communities receive maximum value and proper recognition for their efforts in combating climate change. These communities are already feeling the impacts of climate change and need all the resources they can gather to address it. (UC)

48. We strongly encourage the discontinuation of the CDM Tool (at least in its current form) to derive a region fNRB values for the two main reasons: 1. The definition of fNRB is conceptually incorrectly calculated as NRB/H in the tool in the same way as it is taken up by MoFuss and described in point 1; 2. All available input data that the tool requires is not available in the necessary accuracy level and with the tool itself not accounting for uncertainty of input parameters, the fNRB “values” derived from the tool to not meet any minimum requirements for data robustness; 3. In the past the input parameters for calculations performed with the TOOL30 were not checked correctly by the validation bodies and standards, allowing for very inconsistent calculations. (FMC)

49. Appendix 3 TOOL30 Revisions Paragraph 4: The document proposes changes to TOOL30 in the Results section, yet the 4C CLEAR Methodology, which we understand will become the methodology for Article 6.4, scraps TOOL30 altogether. If the document is recommending use of TOOL30, with MoFuSS used to calculate the inputs, state clearly that this is the case. If TOOL30 is no longer recommended, state this clearly. (TASC, SB, SP, PM, PDF, EB, BURN)

50. Consider disallowing the use of TOOL30 by all UN cookstove crediting projects and mandating the use of national or subnational default values from the MoFuSS model when available. (CCA)

6. Data Quality and Missed Parameter(s)

51. Below is the summary of public inputs received related to “Data Quality and Missed Parameter(s)”. (RR, SN, ESS, SP, PM, PDF, LU, CIC, EB, BURN)

52. One way to compensate for the reduction in ERs is by making the actual emission factor (EF) for fuelwood, which is 112, and not the existing 81.6, which is the levelized EF. (RR)

53. Data Granularity and Quality: The proposed methodology relies heavily on existing datasets, some of which may be outdated or lack the necessary granularity to accurately reflect local conditions. This is particularly concerning in regions where biomass consumption and regeneration vary significantly across short distances. The use of global datasets, while comprehensive, can mask these local variations and lead to inaccuracies in fNRB calculations. (SN)

54. We propose for the MoFuSS model to use a more recent data that is also publicly available, such as from the European Space Agency (ESA) data which can be accessed in this link: https://climate.esa.int/en/projects/biomass/ (ESS)

55. Para 86: It is noted that the MoFuSS model acknowledge the complexities in the simulation of woodfuel harvest and regrowth. The model is assuming that all input values are very reliable however we found that there is already a more recent data available that can be used for the input, e.g. the biomass stocks data, that was not used in the modelling. We ask for UNFCCC to conduct thorough validation of the data used in the modelling to ensure that these data reflect the most up to date situation. (ESS)

56. Annual per-capita: LatAm values for annual per-capita consumption in kg are set at 1.11 kg, whereas a newer dataset (Rob Bailis, July 2024) sets that value at 1.25. Note discrepancy and adjust if appropriate. (SP, PM, PDF, EB, BURN)

57. While including the carbon pools would make an already complicated model much more complex, but since MoFuSS is a dynamic module overtime, may be good to consider a literature review and provide a snapshot of the different systemic effect including, if possible, of the sequestration – and give an indication of the net effect due to wood fuel use for cooking. (LU)

58. Para 24 - Dataset is over 10 years old: There is no justification to use old data. Clean cooking projects require baseline that is less than three years old. Same standards should be applied. Use datasets that are less than 3 years old. (CIC)

7. MoFuSS Model: Uncertainties, Complexity & Improvements

59. Below is the summary of public inputs received related to “MoFuSS Model (uncertainties, complexity & improvements)”. (RR, FMC, AA, LB, TASC, SB, DAH, CCA, ESS, SN, SP, PDF, LU, CIC, VL, EB, BURN, SCB)

60. The revised values are very low when compared with the existing values. For example, Myanmar's fNRB of 61% will be reduced to just 30%. The report, if adopted, will have devastating consequences for the carbon-financed improved cookstove project…All large-scale improved cookstove projects around the world are carbon-financed and not government-funded. The revised fNRB values will reduce emissions by up to 80%. For example, if a carbon project is reducing 2 tCO2/yr/ICS, then after using new fNRB values, it can claim only 0.25 tCO2/yr/ICS or even less. This will make it impossible for a carbon investor to fund projects and for projects to survive. (RR)

61. While we generally welcome to detailed, spatially sensitive modelling approach of MoFuSS until this point, strongly disagree with the derivation of fNRB as described in equation 4. As already stated in the previous submission and as confirmed by external

forestry experts, we are convinced that this calculation of fNRB as the quotient between the amount of non-renewable biomass NRB and the total woody biomass harvest H in the area is conceptually wrong… We understand that this feedback might have major implications on how the fNRB is handled. While MoFuSS brings many improvements over old approaches and greatly enhances data quality its final definition of fNRB is conceptually incorrect. We thus strongly urge the authors and the MP to reconsider this feedback and allow sufficient resources and time to develop a consistent fNRB model and not adapt a conceptually wrong model. In case this suggestion despite its urgency should be dismissed, we advocate that at least the concept of a marginal fNRB as e.g. Burn stove has been suggesting, is adopted in MoFuSS as it is closer to a correct representation of reality than the current fNRB definition. (FMC)

62. From a scientific standpoint we welcome the refined model input parameters and the newly developed uncertainty estimation that accounts for uncertainty from at least one major input parameter, making. However, as many of the suggested model outcomes show very large standard deviations, it is unclear to us how these uncertainties should be accounted for in the actual project development and the emission reduction calculations (none of which have the potential to consider uncertainty ranges as of today). We request that further guidance is provided on how the uncertainty estimates should be treated in projects and the calculation of emission reductions. (FMC)

63. Para No. 42 - Guidance or requirements should be provided for how to include (exclude) plantations from individual project-specific modelling exercises, i.e. plantations should likely be identified, quantified, and considered "difficult to access" in a project specific model (not ignored). (AA)

64. Para No 46 / footnote 11 - There is tremendous variability in the NCV of both wood and charcoal. IPCC also attests to this. What are your thoughts on how this impacts the results of MoFuSS and in general the accounting of emission reductions from household cooking? (AA)

65. Para No. 70 & 71 - The model assumes wood for charcoal comes from areas with high-fNRB. However, it seems likely that wood for charcoal would come from locations the optimally combine accessibility with wood availability (e.g. ample supply), and it is not self-evident that those would be the same locations as "high-fNRB administrative units in rural areas". Recommend re-evaluating this assumption and determine whether another set of criteria could be more accurate for the assumption on the source of charcoal used in urban areas and the urban fNRB, for example distance to urban demand center for charcoal and availability of biomass. (AA)

66. Section 3.4 Paras (98-93) - It would be interesting to see the variability of outcomes if fuelwood harvest is varied. I.e. given that for example 0.4 t/p*year seems a little low for SSA, it would be interesting to see how much fNRB varies if values closer to observed averages are applied in the model. (AA)

67. Para (61) - “Where “j” is a pixel in the “project area” and “project area” is shorthand for a country, sub-national administrative boundary, or any project-specific geographic boundary. However, the boundary should be selected such that the area includes all likely harvest areas used by the target woodfuel consuming population.” This is very different from the “project area” or system used in the usual clean cooking methodologies, for which the “project emission” represents the emissions from the households in the clean cooking project – not all the households in the landscape. (LB)

68. Results: The current report does not provide any suitable reviewing advice for carbon credit buyers, developers and investors to illustrate that these numbers are effectively desk based figures that are subject to material changes when new inputs and assumptions are used (which are often generated from utilising local knowledge). Instead, the UNFCCC / the authors need to make clear that these figures can, and fundamentally should, change when the MoFuSS inputs and assumptions are updated with better and more contextual understanding of the underlying country and region. As part of any 'official' communication of such figures there needs to be a disclaimer that these figures are derived from desk-based research and subject to material change when inputs and assumptions are revised to adhere to local knowledge. Ideally the report should also clearly list in a table where generic assumptions have been made so that the average carbon market participant, who is not an academic in nature, can better understand why there are likely to be material differences in model outputs when improved inputs are used. (TASC, SB, DAH, SP, PDF, EB, BURN, SCB)

69. Table ES1 Para (3) - Summarised Results: We note with concern that standard deviations are high, bringing the accurateness of the model and values into question. Please provide a clearer explanation for how project developers should interpret the high Standard Deviations. For example, availability of evidence applicable to the project context could determine the use of upper or lower SDs. In particular, please provide direction on the SD tolerances that are feasible for developers given that the tool can generate such wide SD ranges. (TASC, SB, SP, PDF, EB, BURN)

70. 1.4 Uncertainty Para (10) – Uncertainty: The resulting standard deviations of the default values is a cause for concern in terms of the robustness of these results. The low number of simulations (30) while varying only one parameter seems to be too low to enable acceptable results. We suggest running the simulation while varying all parameters simultaneously for a minimum of 1,000 times. (TASC, SB, SP, PDF, EB, BURN)

71. 2.4 Reassessing fNRB, Para 20 – 25 - Reassessing fNRB: It is acknowledged that MoFuSS "requires some expertise to run," and it is well known that further development is required to enable PDs to replace default values with project-specific values. Default values are in many cases inaccurate and are derived from datasets that are "all 10 or more years old" per the document. So, it is important that PDs can assess accurate, ground-truthed values and implement them. MoFuSS derived values should only be implemented after development work is complete and it is possible for PDs accurately define the inputs. (TASC, SB, SP, PDF, EB, BURN)

72. 3.1 Updated fNRB values for low- and middle-income countries, Para 80: 1) Please provide a clearer explanation for the high Standard Deviations for the modelling and the value in terms of accuracy of using these numbers in our estimates. 2) The latest proposed fNRB numbers have drastically different ratio than the previous CDM defaults as well as the Q3 2023 MoFuSS output. These variations in the computation and final default fNRB values highlights the need for further and broader scientific engagement before any determinations on the matter are concluded. (TASC, SB, DAH, SP, PDF, EB, BURN, SCB)

73. 3.7 Addressing large differences between Oct 2023 and the current release, Para 105 - Kenya: It is stated that woodfuel demand in Kenya is projected to decrease between now and 2030. A study published in 2020 in Biomass and Bioenergy indicated that the woodfuel demand in Kenya was projected to increase from 26 million m3 to 40 million m3 per annum from 2007 to 2020 with an estimated supply of 31 million m3/year. Currently it is estimated that the demand in Kenya is 41.7 million m3. Some studies suggest that the demand for

biomass energy will rise by 40% by 2040 in SSA. This all points to the demand for woodfuel increasing. Thus, on what basis was it established that the demand would decrease? Substantiate how it was determined that woodfuel demand would decrease in Kenya, as it is clear from literature that it is not the case. (TASC, SB, SP, PDF, EB, BURN)

74. Appendix 2 Figure 22 - Simulated deforestation patterns: Here the authors acknowledge that “MoFuSS pattens result in unrealistic given the coarse resolution used in the study”. The implications of the difference between deforestation predicted by MoFuSS and those that are observed is not clear. Is the implication that MoFuSS’s predictive capabilities are insufficient, or that the model needs to run at a higher resolution? Please provide additional explanation of the causes and implications. (TASC, SB, SP, PDF, EB, BURN)

75. Uncertainty and Assumptions: The article acknowledges significant uncertainties in input parameters, such as growth rates and biomass consumption patterns. While Monte Carlo simulations provide a range of possible outcomes, they do not fully mitigate the uncertainty inherent in these estimations. Additionally, the assumptions made regarding the distribution of woodfuel harvesting and consumption, particularly the static nature of urban and rural classifications, may not accurately reflect on-the-ground realities. (SN)

76. The correct interpretation of fNRB as it is necessary to obtain information on how many emission reductions can be derived from a reduction of woody biomass harvest should be the following: 1. It needs to be demonstrated that a region does indeed suffer from overexploitation of woody biomass caused by woodfuel use (NRB > 0); 2. For NRB <0, fNRB is 0; 3. If NRB > 0, then the fraction of non-renewable biomass describes how much a reduction of woody biomass harvest H translates to a reduction in overuse of the biomass, which is NRB. This is a seemingly small but conceptionally huge difference that we believe was (FMC)

77. 3.4 How sensitive are MoFuSS fNRB results to input parameters?, Para 90 & 92: 1) We suggest that simulations where woody consumption is varied are also run (see related comment below), since this is one of the most important variables for the estimation of fNRB. 2) We recommend the UNFCC provides further funding to finalise the validation before the numbers are finalised. Provide more funding and time to the MoFuSS authors to complete the study and submit the most accurate and up to date values for public consultation. (TASC, SB, DAH, SP, PDF, EB, BURN, SCB)

78. Support the development of an open-access cloud-based version of the MoFuss model, which will allow interested stakeholders to develop their own modelling scenarios for an area of interest using their own inputs, which could be based on government data or data derived from field measurements. (CCA)

79. We believe that tree plantations should be an applicability / eligibility criterion instead of a variable in model for biomass supply. If a project has any relationship with plantations, this relationship should be excluded from the carbon project. We ask for UNFCCC to make clearer reference about tree plantation involvement in carbon project. (ESS)

80. Para 70 - Urban fNRB is estimated by assuming urban woodfuels originate from high-fNRB administrative units in rural areas and define urban fNRB in each country as the average of the upper 50% percentile of all rural administrative units. This assumption on fulfilment from the high-fNRB units in rural areas is not always true. Carry out data collection for better evidence. (LU)

81. Para 103, 104, 105 and 106 - With regards to larger differences between Oct 2023 and current release – one of the principal parameters is the trade but with opposite results – what was the evidence for isolating both islands of São Tomé and Príncipe and Comoros from the SSA and for including Djibouti clustering with Ethiopia, and Somalia. In the case of Kenya, again changes in the flow of woodfuel reverses based on a study and anecdotal evidence – this sounds not very robust. Details on these would be useful otherwise it just looks that assumptions are being made at random and are not evidential. Carry out data collection for better evidence. (LU)

82. Para 21 - In reality, spatially, the rural areas are constantly changing to urban areas based not only on the population but also the other parameters, manly the road and other infrastructure, e.g. in Nepal rural councils are converted to Urban councils/metropolis periodically – however, there is not a clear timeline for doing this. (LU)

83. Para 33 - It is possible to carry out separate analyses for wood and charcoal, while separating them into different models would result in lower fNRB estimates for both fuel pathways. An example on this similar to Appendix 2 on why deforestation module was not used, e.g. Ghana, could be useful to underline why separating out is not beneficial. (LU)

84. Para 34 - MoFuSS assesses fNRB as the joint impact of fuelwood and charcoal harvesting together, which is additive. However, non-renewability due to charcoal use is expected to be higher because its production is a high biomass resource practise– provided the source of charcoal production can be identified non-additively. Is it possible to estimate the ratio of impacts due to firewood and charcoal on the average fNRB. (LU)

85. Table 5 - Standard deviations are way too high: In financial markets, “information ratios” are used to assess the skills of an investment manager. Signal to noise ratio is a more widely understood concept to evaluate the utility of signals coming out of a model. The levels of standard deviation relative to mean for fNRB values in Table 5 are exceptionally large. Smaller the standard deviations are relative to size of the mean, higher is the perceived credibility of the model. In large countries like China and India, the ratio of Standard Deviation/ Mean fNRB is as high as 3.5x to 4x, while in countries like Indonesia it is over 20x. Even in smaller countries like Colombia and Guyana, the ratios end up being too high to even mention as the base is zero or very low. It is very difficult to build credibility for a model that has such massive levels of standard deviation. Difficult to suggest a solution. Reinforces the need for thorough independent investigation of the model, inputs, assumptions, and outputs through teams of independent experts. Table 5 Results: The latest proposed fNRB values differ significantly from the previously approved CDM defaults and the Q3 2023 MoFuSS output. For example, the current valid fNRB approved by CDM EB for Myanmar is 0.615 with validity till 22/12/2025, higher than the latest proposed value. The variations on fNRB value reflects the need for further and boarder survey before final decisions. We propose a third round of public consultation on the fNRB values. (CIC, VL)

86. Alignment with forest cover targets: Several countries have announced targets to increase the area under green cover. The proposed model appears to ignore this factor and aims to preserve current cover at best. In countries where there are official targets to increase this cover, the NRB calculation needs to take this factor into account. For instance, if the current forest cover is 25% and that is targeted to be increased to 30%, there would be an additional implied demand of a 5% cover of biomass. It is suggested that this be factored into the model, to ensure that projects are aligned with national targets for forestry cover. Since forest cover targets are not mentioned at pixel levels, the model may need to use a

standardized adjustment factor for each country based on available data on forest cover in the country and the targeted percentage forest cover in the country. For instance, if the forest cover in a country is 23% in 2023, and the country targets to increase forest cover to 30% by 2030, every year's additional biomass supply should be adjusted to reflect that target so that projects are aligned with such targets. (CIC)

8. Account for Non-Residential Wood Fuel Demand

87. Below is the summary of public inputs received related to "non-residential wood fuel demand." (FMC, TASC, SB, SP, PDF, CP, LU, UEG, BLE, EB, BURN)

88. The model not accounting for non-energy woods demand and timber introduces a huge bias in some countries. The text gives an example from South Africa, stating that "any inaccuracies as a result of ignoring plantation are likely minimal" as only 2% of the country's total land area is managed forests – but it fails to notice that this is almost 1/4th of the entire forest area of the country and thus a non-negligible. In other countries like India, all forests in the country that are not protected areas are managed forests where large amounts of timber extraction happens that the model fails to account for. We request that further effort is made to parametrize how much of each countries/regions forests are under management and how much timber is likely to be extracted. While in some countries this number might indeed be negligible, in other countries this leads to a strong bias towards very low fNRB values that overestimates the amount of available renewable biomass by neglecting timber extraction. (FMC)

89. Accounting for non-energy wood demand Para 2.9: 1) We request clarification of the approach adopted for demarcation of natural forest and plantations in the 2010 NASA biomass map or else the non-energy wood demand to be accounted in the MoFuSS model. 2) An additional round of published MoFuSS numbers is needed that must account for a combination of evidence from recent KPTs and other surveys, often commissioned by Governments themselves, at the individual country level when considering baseline biomass consumption by households. (TASC, SB, SP, PDF, EB, BURN)

90. The quantification of non-residential fuel consumption should be cross-checked with national studies by Host Country governments. It is impossible to get to accurate figures with such data being overlooked. (SP, PDF, EB, BURN)

91. We suggest that the model developers' and/or UNFCCC independently, conduct a more thorough literature review to obtain more accurate values on non-domestic woody biomass demand in SSA. The following references could be useful as a basis for an expanded literature review. While they do not provide exact estimates of overall non-domestic consumption, they do indicate quite substantive values on absolute and relative basis for different non-domestic uses, which are indeed intense in SSA, such as brick making, tobacco curing, etc. (SP, PDF, EB, BURN)

92. 39 Table Note (d) - Residential, commercial, and industrial woodfuel consumption: This report did not include commercial or industrial wood fuel consumption - only public institutions. We suggest including wood fuel consumption for commercial purposes as well, as in many countries, this type of consumption is significantly high. Accounting for commercial use will provide a more accurate and comprehensive assessment. (CP)

93. Given that there is need for robust data and accurate maps on demand and use of woodfuel/wood for non-residential as well as for non-energy purposes, carry out data collection for some sample locations and countries. (LU)

94. The research team to clarify their approach of exclusion of forest plantations in their initial biomass stocks sourced from 2010 NASA biomass maps. Otherwise, the biomass demand for non-energy applications namely building constructions and timber export needs to be included in the model. (UEG, BLE)

9. Wood Fuel Consumption Data

95. Below is the summary of public inputs received related to “wood fuel consumption data”. (TASC, SB, DAH, IC, SP, PDF, CP, UEG, BLE, KTH, PML, EB, BURN, SCB)

96. 2.11 Quantifying household woodfuel consumption, Para 45: Please clarify why the default baseline woody consumption values have remained low, below the level observed by the UN (Table 3) and by ongoing projects. (TASC, SB, SP, PDF, EB, BURN)

97. 2.11 Table 4 (46) - Residential Biomass Consumption: The MoFuSS tool estimates non-renewable biomass primarily as a function of population data and estimated fuel consumption metrics. In particular, the authors use a default wood fuel consumption of 0.4 tonnes per capita across Sub Saharan Africa. We consider this default to be too low as there is no academic support or justification for its inclusion. The quantification of wood fuel consumption data should be done nationally and should be sourced from updated Host Country approved surveys. (DAH, SP, PDF, EB, BURN, SCB)

98. In cases where there is accurate and reliable data on non-residential biomass consumption, such as is the case in Rwanda, this multiplier should be made in the MoFuSS model numbers for that country based on the actual data, not through a weighted average. In these revised numbers, Rwanda has an fNRB calculation with a non-residential biomass usage input that is incorrect. Whilst Bailis acknowledges that ‘when carrying out detailed, country specific studies these numbers can be adjusted’ the current consequence is that these public revised default fNRB numbers for Rwanda are based on this incorrect data input. The model should be run again for Rwanda with the specific country evidence backed assumptions used as inputs. In general, the default fNRB numbers should always apply national-level data and inputs, rather than generic inputs. (DAH, SP, PDF, EB, BURN, SCB)

99. Residential Charcoal Consumption and Institutional Wood Consumption: Recommendation: Reassess the fNRB values using a marginal approach for regions with high residential charcoal consumption and significant institutional wood consumption. This reassessment should be based on more localized and detailed data that accurately reflects the intensity and concentration of biomass extraction for these purposes. Proposed Actions: • Conduct a thorough review and update of data on residential charcoal production and consumption, particularly in regions where charcoal is a primary cooking fuel. This review should include the inefficiencies of charcoal production processes that result in higher wood demand and lower regeneration rates. • Assess institutional wood consumption on a more granular level, focusing on the impact of concentrated demand in urban and peri-urban areas where institutions are typically located. • Use the findings to adjust fNRB values upwards where evidence shows that residential charcoal and institutional wood consumption significantly contribute to marginal biomass non-renewability. This is justified by the need to more accurately capture the environmental

impact of residential charcoal consumption (and associated production) and institutional wood consumption, the marginal impacts of which may be underestimated in generalized models. (IC)

100. Based on this analysis, it is crucial to use the most accurate and up-to-date wood consumption data available. The report should be updated to reflect either the CLEAR methodology value (0.8 tons per capita per year) or the Gold Standard value (0.9 tons per capita per year) for regions outside Latin America, rather than the current 0.4 tons per capita per year. It is strongly recommended to update the report with wood consumption data that more accurately represents the current situation, rather than relying on the default values provided by the CDM Tool. This update is essential for ensuring the accuracy and reliability of the fNRB calculations and subsequent policy decisions. (CP)

101. 48 (b) - Map fuel use among the population: “We define urban and rural areas by ranking all pixels from the WorldPop map by population density in descending order and defining a cutoff such that the cumulative sum of pixels in descending order equals UNDESA’s estimate of the country’s urban population in that base year. The pixels that add to the urban cut-off are defined as urban and the remaining pixels are defined as rural.” The process outlined in the report is not viable as it does not account for the variability in impact across different countries. The degree of impact can significantly differ from one country to another, and this variation needs to be considered for a more accurate assessment. (CP)

102. Para 37 - Stacking is understood to influence the final estimates of firewood consumption significantly and therefore the fNRB estimates. We previously suggested modelling scenarios for countries with reliable stove and fuel stacking data and compare the differences. If inclusion of stacking is shown to have significant effect, then the methodology adopted should allow project developers to include evidence on stacking in their project areas, and then adjust the fNRB by an appropriate factor. Something similar to the Appendix 2 on why deforestation module was not used, e.g. Ghana. (LU)

103. The research team to come up with reliable sources like regional study, official statistics, IEA statistics, UN data, localized surveys, registered PDD etc.” for calculating biomass consumption for Residential, commercial, and industrial wood fuel rather than basing the data over assumptions. (UEG, BLE)

104. The current model does not differentiate between various types of woody biomass, instead providing an average fNRB value. However, there is a significant difference between firewood and charcoal in terms of renewability and impact. Firewood is often manually gathered in close proximity to households, while charcoal is typically purchased from sellers who obtain it through more resource-intensive processes. Given these differences in renewability timeframes and the nature of their procurement, it is essential that the methodology distinguishes between the two. Allowing project developers to use specific fNRB values corresponding to the type of woody biomass utilized in their projects, rather than an average, would lead to more accurate and fair assessments. In conclusion, it is recommended that the methodology be updated to allow for the calculation of project-specific fNRB values where appropriate and to differentiate between firewood and charcoal to better reflect their respective renewability impacts. (KTH, PML)

10. Biomass Stock and Growth Functions

105. Below is the summary of public inputs received related to “biomass stock and growth functions”. (TASC, SB, DAH, SP, PM, PDF, UEG, EB, BURN, SCB)

106. 2.5 Biomass stocks, para 23 - Data Inputs: Biomass Stocks: 1) The comparison of Global Forest Watch data with regards to the relationship between overall tree cover loss and annual tree cover loss by dominant driver (resulting in permanent deforestation) suggests a reassessment of the fNRB value. This has been evidence for Rwanda and it is likely needed for other countries. 2) More detail is required about how the authors considered these well understood, and written about, data issues to calculate accurate, and reliable, fNRB numbers. 3) Country specific data and locally produced spatial maps are needed to calculate an accurate fNRB figure. 4) Add an additional section in the report detailing how these misclassifications would impact the ‘default’ fNRB figure. 5) Please add a section on how the model calibration for biomass stocks were completed and add calibration plots. In particular, the report should include a cross comparison between 2020 data generated by the model and real observed 2020 biomass stocks. This can help validate the predictions from the model. We strongly recommend the researchers use to most recent biomass stock maps or alternatively if the NASA vintage maps is still used a validation process is a must. UNFCCC shall ensure the model is fully calibrated to garner wide acceptability from the carbon / scientific community. (TASC, SB, DAH, SP, PDF, EB, BURN, SCB)

107. 2.6 Biomass growth functions, Para 33: We recommend these aspects be reviewed and a clarification is provided on whether the model considers the impact of agriculture not only as a primary driver of deforestation (conversion of forest lands) but also as an activity that is likely to be implemented on lands that were previously deforested and as such would prevent regeneration on such lands by occupying them, thus impacting the amount of natural generation in fNRB calculations. (TASC, SB, SP, PDF, EB, BURN)

108. Biomass Growth Functions: It is states that the "simulation allows trees to grow to their full potential unless affected by woodfuel harvesting." This does not account adequately for other drivers of deforestation, which speaks to the importance of accounting for other drivers of demand in the MoFuSS calculations. Require that MoFuSS include in its calculations a realistic data set on drivers of demand unrelated to fuelwood harvesting. (SP, PM, PDF, EB, BURN)

109. We strongly recommend the researchers to use the most recent biomass stock maps from sources like Orb5 with high or medium resolution (30 m) or alternatively if the NASA vintage maps is still used, we recommend a validation process to have credible results. UNFCCC shall ensure the model is fully calibrated to garner wide acceptability from the carbon / scientific community. (UEG)

110. We would strongly recommend the researchers to conduct iterations of MoFUSS model with different rmax values to match the actual forest cover loss occurred in the past. The most realistic / region specific growth function of the biomass to considered based on the test results. (UEG)

111. Location-tailored fNRB Values and Demand Scenarios.

112. Below is the summary of public inputs received related to “location-tailored fNRB values and demand scenarios”. (UC, TASC, SB, DAH, CCA, SP, PDF, LU, UEG, VL, KTH, PML, EB, BURN, SCB)

113. Collaborate with Grassroots Organizations for Areas with Insufficient Data: In rural, hard-to-reach areas such as Haiti, large datasets are often incomplete or entirely unavailables. For those cases, grassroots-level organizations like ours can leverage our on-the-ground teams to provide supplemental data and more accurate measurements to establish fair fNRB values. (UC)

114. Allow Local Surveys for Temporary fNRB: Allowing small organizations to conduct local surveys to determine a temporary fNRB value for their initial registration can lower the barrier to entry for those working in hard-to-reach areas. As projects grow, require these organizations to support their findings with additional data, and if over-crediting occurs initially, subtract those credits from later years. (UC)

115. Validation of sub-national defaults: The intention is that project developers can use an open-access tool to generate sub-national defaults. We welcome this, but question what framework will be provided to VVBs to validate the numbers generated by project developers based on project or sub-national boundaries. Please develop guidelines for VVBs to validate MoFuSS derived sub-national or project fNRB values. (TASC, SB, SP, PDF, EB, BURN)

116. Local Data Inputs: It is clear from reviewing the latest report that there are several local / national variations that need to be considered and researched to build an accurate understanding of fNRB values. For these numbers to become de facto defaults, we recommend the UNFCCC commissions local or regional studies to use localised inputs and assumptions for accurate fNRB values. Only once local inputs and assumptions have been used in the MoFuSS model should there be ‘default’ values approved by the UNFCCC. In the interim period existing fNRB protocols should continue to apply. Local / national variations need to be included in the results before they become de facto default values. (TASC, SB, DAH, SP, PDF, EB, BURN, SCB)

117. Country Groupings: The MoFUSS numbers for Rwanda should be run again with either the exact figure of annual biomass importation (for cooking) taken from the Ministry of Commerce Wood Products Cluster Strategic Plan 2014-2019 (page 20) being applied to the calculation of cross border trade, or, Rwanda should not be grouped with any country (in figure 9.) and no cross-border trade of biomass should be considered as there is no significant verifiable evidence that it is taking place. (DAH, SP, PDF, EB, BURN, SCB)

118. Using a global data set is a necessary first step and allows for harmonized inputs for different geographies. That said, using global data exclusively has limitations. In some countries/areas, there are site-specific considerations related to wood fuel supply and demand that can impact fNRB calculations beyond what modeling with global data alone can quantify. Refine this work by commissioning and integrating complementary site-specific data into the global model for key geographies with special wood fuel supply and demand considerations, (e.g. brick-making and lumber). (CCA)

119. Several incidences of lack of data and specific input parameters suggest taking it to the project and country level for use with updated and/or local data. While development of a web-based application (Appendix 4.2) would allow including local and more updated data across different activity levels - guidelines and trainings on its use for project developers

and national entities (e.g. DNA) and on specific parameters (e.g. Appendix 4.1 on stacking of fuel and stoves) would be useful. In this, an important question is can this create some kind of a perverse incentive on the part of the proponents to carry out quick studies or cherry pick studies, e.g. on trade to manipulate the values - similar to the example mentioned regarding Uganda (Section 8.1, Para 42). This then would bring into question what parameters needs to be checked, how/when, including guidelines for the DOEs/VVBs, with clear punitive and non-punitive measures – for all the stakeholders involved. (LU)

120. We highly recommend the researchers to use the most appropriative country specific wood fuel consumption values based on any official statistics or UN / IEA data or through localised surveys etc. The yielded total household biomass consumption through MoFUSS simulation shall be compared and calibrated host country data sources. (UEG)

121. Local and national variations should be incorporated into the results before they are adopted as default values. UNFCCC should commission local or regional studies to incorporate localized inputs and assumptions. Only after integrating these local inputs into the MoFuSS model should default values be approved by the UNFCCC. (VL)

122. The current methodology primarily provides fNRB values at national or subnational levels. However, this approach may not accurately reflect the conditions of smaller or more localized projects. Many low-scale projects may encounter challenges when required to use a national value that does not represent their specific circumstances. For this reason, it is strongly believed that project developers should be allowed to follow an alternative methodology or guidelines that enable them to present project-specific fNRB values, supported by relevant and credible sources. This flexibility would help ensure that the values used are more accurate and reflective of the project's actual impact. (KTH, PML)

11. Review, Validation & Verification Processes

123. Below is the summary of public inputs received related to “review, validation & verification processes”. (TASC, SB, DAH, SN, CCA, ESS, SP, PM, PDF, CIC, UEG, EB, BURN, SCB)

124. Independent Validation: We have concerns with respect to the MoFuSS tool’s use in the determination of the fNRB without independent validation or approval from a broad selection of experts in the biomass, forestry and geo-imaging industries. While the MoFuSS tool has undergone peer review, the data inputs for fNRB computations have not, driving wide variance between the latest submission and the October defaults. We note with concern that there is a limited availability of individuals or organizations with the required combination of statistical, computing and forestry expertise that this model and its outputs require to assess. Proposed Change: In the absence of a governing framework that can review and certify the outputs of the model in real time, we observe a risk in adoption of values as presented in its current iteration, but also in future iterations of the tool or the underlying definitions of fNRB following these consultations. We recommend that assumptions from global datasets are validated by ground truthed studies and approved by Host Country governments. (TASC, SB, DAH, SP, PDF, EB, BURN, SCB)

125. Timeline for Validation: We suggest to the CDM/UNFCCC that a clear process is established for validating the work before it gets approved as well as for managing future developments and updates. The process would be communicated to relevant stakeholders, with details including timelines, funding, and tools for the external validation/calibration of the latest version of MoFuSS model and its results. In particular,

please advise on opportunities for stakeholder engagement on this issue after September 2024. What happens to this feedback when the transition from the CDM to the Article 6.4 SB happens? (TASC, SB, SP, PDF, EB, BURN)

126. Open Source & Replication: We suggest that UNFCCC allocates a longer review period particularly to allow for independent third-party testing of the model itself by a range of relevant stakeholders, rather than just a review of the published report and results thereof. (TASC, SB, SP, PDF, EB, BURN)

127. 1.5 Validation and next steps, Para (11-12) - Validation and Next Steps: It is stated by these paragraphs that the data/values have not yet been validated. Furthermore, the authors indicate that they will be conducting a series of validation studies in the coming year. We strongly recommend that the UNFCCC allows/commissions these validations to take place before the values are released. Delay release of the fNRB results until they have been validated. We request clarification from the CDM that these are provisional estimates, and that further research is required to garner broader scientific consensus on the quantification approaches and definitions. (TASC, SB, SP, PDF, EB, BURN)

128. 2.4 Key assumptions in MoFuSS, para 22 - Key Assumptions in MoFuSS: MoFuSS relies on several dozen parameters to model land cover change associated with woodfuel harvesting. Based on our request to delay the publication of these numbers before strict validation by experts. We suggest the following modification Values for fNRB provide preliminary results and will only be applicable for use upon a complete validation and verification of the data sets support the MoFuSS tool. (TASC, SB, SP, PDF, EB, BURN)

129. Stakeholders should be able to present evidence on the status of forest plantations, and their resulting accessibility, at the national level and the quality of this evidence should be assess with a view to including this in revised fNRB numbers. Rwanda has been used as an example; however, each country should be reviewed individually and results should be used to input into the model. (DAH, SCB)

130. Validation and Real-World Application: The practical application of the proposed fNRB calculations in real-world projects remains challenging. The article notes that validating these calculations on a global scale is not feasible due to the difficulty in attributing observed changes in biomass to specific causes. Additionally, the complex and technical nature of the MoFuSS model may limit its accessibility and usability for project developers, particularly in resource-constrained settings. (SN)

131. We acknowledge and support the perspectives of SEI and UNAM regarding the importance of national sovereignty, while emphasizing that fNRB values should not revert to being unrealistically high. We support allowing countries some flexibility in adjusting their fNRB values. However, to do so, some guardrails should be put in place to ensure that the allowed adjustment range is not too wide, preventing countries from reverting to prior fNRB values. (CCA)

132. We propose for the report to provide clear information whether the data taken from the open source has been validated by any recognized institution that can confirm the data is correct. If the report continues to use an open source input without clear information on its validity, we ask that UNFCCC provide clear guidance and adequate time for the DOE to review or validate those input prior to the release of these default values. (ESS)

133. It is concerning that "validation was not part of this assignment," yet the figures — which have extremely high standard deviations — are being proposed for adoption. A rigorous academic review should be undertaken to ascertain if: (1) the approach is correct and (2) the inputs to MoFuSS are realistic. (PM)

134. Governance and Independence: Currently it appears the same experts who created the model are guiding UNFCCC which results in clear conflict of interests and is bound to raise concerns on the integrity of processes followed by UNFCCC. 1) UNFCCC should share all peer reviews transparently to all stakeholders and to the public, particularly those reviews that are not just citing the original papers but have critically reviewed the methodology and the model in entirety. 2) If the above are not available, it is suggested that a team of independent experts be appointed to conduct such a review and the results should be made public. 3) The original authors of the papers should not be part of any process that approves the methodology, or guide/educate/influence the committee members who are responsible for approving or rejecting the methodology, except to the extent they are required to clarify any technical points raised by independent experts who review the methodology and the model. (CIC)

135. Para 12, section 1.5 - Model has not been validated, even by the authors: As the authors acknowledge in paragraph 12, section 1.5, of the June 20, 2024 document, the model has NOT been validated even by the authors themselves. They expect to commence validation studies in the coming year and are “exploring” collaborations” to do the same. The transparency of the authors is commendable. Adopting a model that is not validated can cause irreparable damages to the credibility of UNFCCC and the entire clean cooking and safe drinking water projects industry that rely on Tool 30. The industry has already faced several challenges of perception in the recent times, and rushing to adopt a model where the authors themselves have not validated the model could lead to severe negative consequences. It is difficult to emphasize enough the significance of adopting scientific rigour in adopting these methodologies. Every project developer is expected to get every project independently verified. The standards for independent verification should be substantially higher for methodologies and tools, as they are likely to affect hundreds of projects and tens of millions of people for many years. (CIC)

136. Resolving conflicts with national data: UNFCCC needs to a) Ensure sufficient opportunity is provided to Designated National Authorities to review the inputs and model, propose use of their own surveys and on-the-ground data (which may contradict with a new model that uses only satellite-based images and theoretical models) b) Ensure clear guidelines, procedures and protections for project developers who start relying on this model and start contradicting sovereign sources of data and are seen as profiting or enabling ‘unfair’ transfer of emission reduction units/assets to international buyers in other countries. (CIC)

137. Incorporation of country specific inputs, scientific / rational approach wherever necessary and much needed validation exercise to demonstrate the precision and accuracy is needed for widespread acceptance of the MoFUSS tool. (UEG)

12. Transition Timelines, Validity Period and Updating Process

138. Below is the summary of public inputs received related to “transition timelines, validity period and updating process”. (TASC, SB, ESS, SP, PDF, VL, EB, BURN)

139. Application: As there are currently no interim solutions proposed to project developers (PDs) while the review and validation processes of the MoFuSS results are being completed, we anticipate that Project Developers will continue to use existing fNRB protocols. Until the review and validation processes are completed, project developers will continue to use existing fNRB protocols. Any project developers who would like to voluntarily use the draft MoFuSS defaults should be allowed to do so, provided there is guidance for use of the standard deviation (SD) values, e.g. availability of evidence applicable to the project context could determine the use of upper or lower SDs. (TASC, SB, SP, PDF, EB, BURN)

140. We encourage UNFCCC to support the transition of the MoFUSS model to be user-friendly for public users through open-access cloud-based version of the model, so that it can be used by public using the local validated data and therefore will be specific to the local situation. Since this open-access cloud-based version would take some time to develop, we ask for UNFCCC to ensure that there are other options for fNRB values, that may include independent calculation of fNRB, whether through the revised/updated version of TOOL30 or other method that is deemed appropriate. We ask for UNFCCC to ensure independency of the entity that run the MoFuSS model and to ensure that procedure is in place for the DOE to check this independency. (ESS)

141. Country feedback and data releasement: The latest MoFUSS model and proposed fNRB value, should be fully discussed and cross checked with Designated National Authorities (DNAs) as per their available input data, especially for those countries had submitted fNRB to CDM EB previously. Procedures to call for input from Designated National Authorities (DNAs) should be set up with regard to the model as well as data inputs. Releasing the fNRB value by batches as per progress and data availability for each country, so that the values will be fully validated and cross-checked with Designated National Authorities (DNAs), and the feedback from other stakeholders for sufficient inputs thoroughly and scientifically for each country. (VL)

Appendix. Extracts of key recommendations received from stakeholders

Refer to the Appendix file that is published separately with this annex.

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Document information

Version	*Date*	*Description*
01.0	10 October 2024	MP 95, Annex 4 To be considered by the Board at EB 123.

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