ARTICLE 6.4 MECHANISM

A6.4-MEP014-A07

Draft Methodological Tool

Reversal Risk Assessment

Version 01.0

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The Supervisory Body of the Article 6.4 mechanism established by Article 6, paragraph 4, of the Paris Agreement (the Supervisory Body), at its tenth meeting (SBM 010), requested the Methodological Expert Panel (MEP) to prepare recommendations on products related to addressing reversals in the "Information Note: Further work on the methodological products for the Article 6.4 mechanism" (A6.4-SB010-A05).[1] In particular, the Supervisory Body requested the MEP to prepare recommendations on the following matters:

   (a) Guidance on post-crediting period monitoring, reporting, and remediation of reversals, post-reversal action and host Party roles;

   (b) Guidance on late, incomplete, or missing monitoring report submissions and treatment of activities for which a reversal results in removals level that falls below baseline;

   (c) Reversal risk assessment tool; and

   (d) Guidance on avoidable and unavoidable reversals and reversal compensation.

2. The MEP 001, initiated its work on the above issues and agreed to recommend that, due to the overlap and interdependencies between the four separate elements listed in paragraph 1[2] as well as additional removal-related issues in the "Recommendation: Activities involving removals under the Article 6.4 mechanism" (A6.4-SB009-A02)[3] on which the Supervisory Body also requested input, the four elements mentioned above should be incorporated into a single integrated standard on addressing non-permanence and reversals.

3. The SBM 011, agreed on the recommendation of the MEP to consolidate the four related issues and to develop a standard on addressing non-permanence and reversals covering these issues in the "Information Note: Workplan of the Methodological Expert Panel 2024" (A6.4-SB011-A02).[4]

4. The SBM 014, approved the "Standard: Requirements for activities involving removals under the Article 6.4 mechanism" (A6.4-STAN-METH-002) (hereinafter referred to as the "Removals Standard").[5] Section 4.6.1 of the Removals Standard provides direction on reversal risk assessment, and paragraph 37 notes, inter alia, the following reversal risks:

   (a) Activity finance and management, asset ownership, rising opportunity costs;

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[1] See https://unfccc.int/sites/default/files/resource/a64-sb010-a05.pdf.

[2] See https://unfccc.int/sites/default/files/resource/a64-sb009-a02.pdf.

[3] See https://unfccc.int/sites/default/files/resource/a64-sb009-a02.pdf.

[4] See https://unfccc.int/sites/default/files/resource/a64-sb011-a02.pdf.

[5] See https://unfccc.int/sites/default/files/resource/A6.4-STAN-METH-002.pdf.

(b) Regulatory uncertainty and social instability, political, governance and legal risks, acts of terrorism, crime, and war;

(c) Natural disturbances and extreme events such as fires, pests, droughts, hurricanes, floods, landslides, earthquakes, volcanic eruptions, geological faults, and fractures; and

(d) Climate change impacts exacerbating any of the above risks.

5. The SBM 015, approved the “Information Note: Workplan of the Methodological Expert Panel 2025” (A6.4-SBM015-A02),[6] which reaffirmed the MEP’s mandate to propose a draft methodological standard addressing non-permanence and reversals as well as a draft methodological tool on reversal risk assessment that would address the following considerations:

(a) Whether upper limits are needed in respect of the risk rating (overall) or specific risk factors (within the tool), including options and science-based rationales for upper limit(s);

(b) Risk rating that constitutes a negligible risk;

(c) Any further categorization of risk; and

(d) How remediation measures are taken into account in the risk assessment tool.[7]

6. The MEP 005, began work on the draft “Methodological tool: Reversal risk assessment” consistent with the Supervisory Body’s updated mandate to develop a separate methodological tool, while also continuing its work on the Supervisory Body’s earlier mandate to develop a methodological standard addressing non-permanence and reversals.

7. The MEP 008, recommended a draft “Standard: Addressing non-permanence and reversals” (A6.4-MEP008-A03).[8] This document included proposed direction to mechanism methodologies and proposed direction to activity participants in separate appendices.

8. The SBM 018, reviewed the MEP’s recommended draft standard and approved two documents:

(a) “Standard: Addressing non-permanence and reversals in mechanism methodologies” (A6.4-STAN-METH-007) (hereinafter referred to as the “Reversals Standard”), incorporating all provisions directed at mechanism methodologies;[9] and

[6] See https://unfccc.int/sites/default/files/resource/A6.4-SBM015-A02.pdf.

[7] The MEP notes that although the Supervisory Body used the term “remediation” in this mandate, it might be more consistent to use the term reversal risk “mitigation” because “remediation” has a separate and distinct meaning in the context of addressing verified reversals in the Removals Standard and Reversals Standard. Accordingly, the MEP refers to reversal risk “mitigation” here to avoid potential confusion, without any intent to change the substantive meaning of the original mandate.

[8] See https://unfccc.int/sites/default/files/resource/A6.4-MEP008-A03.pdf.

[9] See https://unfccc.int/sites/default/files/resource/A6.4-STAN-METH-007.pdf.

(b) "Information Note: Elements related to non-permanence and reversals for inclusion in relevant regulatory documents" (A6.4-INFO-METH-002) (hereinafter referred to as the "Information Note"), incorporating all provisions directed at activity participants.[10]

9. The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement, at its seventh session, requested the Supervisory Body to continue to ensure that methodological standards and tools "are based on the best available science and are informed by robust evidence" as well as to prioritize work on mechanism methodologies to support the transition of activities into the Article 6.4 mechanism (Decision 20/CMA.7, paragraphs 23-24).[11]

10. The MEP 014, agreed to structure the draft "Methodological tool: Reversal risk assessment" as a modular tool and to initiate a call for public input. The first version of the tool would be applicable only to activities that reduce non-renewable biomass consumption, including clean cooking activities. The MEP also agreed that additional applications would be incorporated into future versions of the methodological tool.

2. Purpose

11. The purpose of this draft methodological tool is to allow activity participants to:

(a) Calculate the parameter $F_{buffer,i,t}$, which is used in mechanism methodologies to determine the number of Article 6, paragraph 4, emission reductions (A6.4ERs) to be forwarded to the reversal risk buffer pool account, consistent with equation (8) of version 01.0 of the Reversals Standard; and

(b) Determine whether the stored greenhouse gases (or precursors of greenhouse gases) for which A6.4ERs have been issued are at a negligible risk of reversal, as defined in their applicable mechanism methodology.

12. The first version of the tool is applicable only to Article 6.4 activities that reduce the consumption of non-renewable biomass (e.g., clean cooking activities).

3. Key issues and proposed solutions

3.1. Definitions

13. To facilitate a common understanding that can be applied across different greenhouse gas reservoirs and activity types, this draft methodological tool defines key terms (see paragraph 6 of this tool). The definitions are intended to provide flexibility in assessing reversal risks across different levels of granularity, depending on the characteristics of greenhouse gas reservoirs, activity types, and the availability of relevant data.

14. The proposed approach focuses on calculating reversal risk factors across different reversal risk types (e.g., losses due to individual reversal risks, such as wildfire, or broader categories of reversal risks, such as natural reversal risks).

15. Consistent with the Supervisory Body's mandate to address reversal risk mitigation (see paragraph 5(d) and footnote 7 of this cover note), the proposed approach also incorporates reversal risk mitigation factors that reduce the reversal risk factor for a given

[10] See https://unfccc.int/sites/default/files/resource/A6.4-INFO-METH-002.pdf.

[11] See https://unfccc.int/documents/655275.

reversal risk type, based on reversal risk mitigation measures that reflect the expected effect of anthropogenic interventions.

16. The MEP notes that the provisions developed for this version of the draft methodological tool involve the use of default values for reversal risk factors for both natural and human-induced reversal risks, and reversal risk reduction factors for human-induced reversal risks only. Future extensions of the draft methodological tool to address other activity types may include or require other approaches (e.g., a site-specific reservoir assessment), depending on the characteristics of the applicable greenhouse gas reservoir.

17. The draft methodological tool also includes an approach to calculate the parameter $F_{buffer,i,t}$ (as discussed in section 3.5 below of this cover note), consistent with equation (8) of version 01.0 of the Reversals Standard and based on the reversal risk ratings for natural and human-induced reversal risks.

3.2. Scope of application

18. The MEP determined that reversal risk assessment may require distinct considerations depending on the characteristics of different greenhouse gas reservoirs and activity types. Accordingly, the MEP agreed to structure the draft methodological tool as a modular document, with distinct applicability conditions and distinct substantive provisions across applications.

19. To support the transition of clean cooking activities from the Clean Development Mechanism to the Article 6.4 mechanism, the MEP agreed that the first application of the draft methodological tool should apply only to Article 6.4 activities that reduce non-renewable biomass consumption, including clean cooking activities.

20. General applicability conditions, which are intended to apply to all eligible activity types, are provided in section 4.1. Additional applicability conditions for activities reducing non-renewable biomass consumption are provided in section 4.2.

21. The MEP will further update the draft methodological tool to support additional activity types in future work. As announced in prior public plenary presentations, and without prejudice to any other potential applications, the MEP is already working on updates to this draft methodological tool to address the following applications:

(a) Forestry;

(b) Subsurface geologic storage; and

(c) Biochar.

3.3. Classification of reversal risk types for activities that reduce the consumption of non-renewable biomass

22. The MEP notes that Article 6.4 activities that reduce the consumption of non-renewable biomass are issued A6.4ERs for reductions in losses of non-renewable biomass (i.e.,

biomass gain relative to the baseline) in forests and has classified the reversal risks for this application into two categories:

(a) Natural reversal risks (section 5.1.1);[12] and

(b) Human-induced reversal risks (section 20).[13]

23. Furthermore, given the significance of wildfire-related reversal risks and the ability to distinguish wildfire-related forest carbon losses from other natural drivers of forest carbon loss (e.g., drought and insect outbreaks), the MEP subdivided natural reversal risks into two types:

(a) Wildfire; and

(b) All other natural reversal risks.

24. Accordingly, the reversal risk analysis for Article 6.4 activities that reduce non-renewable biomass consumption is conducted across the following reversal risk types:

(a) Wildfire;

(b) All other natural reversal risks; and

(c) Human-induced reversal risks.

3.4. Determining default values for reversal risks

25. The MEP proposes to assign default values in the draft methodological tool for reversal risk factors and, where applicable, reversal risk reduction factors. The MEP notes that the choice of default values has implications for the operation of the reversal risk buffer pool account as well as the economics of Article 6.4 activity development:

(a) Where reversal risk assessments determine buffer pool contributions that are lower than is necessary to compensate for Article 6.4 activities' actual reversal risk, this poses the risk that the reversal risk buffer pool account will not be able to cover the reversals and may become insolvent; and

(b) Where reversal risk assessments determine buffer pool contributions that are higher than is necessary to compensate for Article 6.4 activities' actual reversal risk, this will increase the cost of generating A6.4ERs and potentially discourage the development of Article 6.4 activities.

26. As indicated in "Concept note: Options for implementing the provisions in paragraph 62 of the "Standard: Requirements for activities involving removals under the Article 6.4 mechanism"", the Supervisory Body has not yet determined the level of confidence that the Supervisory Body seeks to establish in making a determination that the assets of the reversal risk buffer pool account are sufficient to cover its liabilities[1414].

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[12] This category is intended to align with paragraph 37(c) of version 01.0 of the Removals Standard. As noted below in section 3.4.2 of the cover note, the default values for natural reversal risks take into account the projected effects of climate change, consistent with paragraph 37(d) of version 01.0 of the Removals Standard.

[13] This category is intended to align with paragraphs 37(a) and 37(b) of version 01.0 of the Removals Standard.

[14] See section 3.1.1 of A6.4-MEP014-A08.

27. The MEP notes that determining the intended level of confidence in the reversal risk buffer pool account would be helpful to guide the determination of reversal risk ratings. In the context of Article 6.4 activities that reduce non-renewable biomass consumption, however, this determination may not be necessary to guide the determination of reversal risk ratings because mechanism methodologies for this Article 6.4 activity type are expected to:

(a) Not require activity participants to monitor, report, or remediate any reversals that may occur, pursuant to flexibility provisions provided in section 5 of version 01.0 of the Reversals Standard; and

(b) Require that A6.4ERs contributed to the reversal risk buffer pool account are to be immediately cancelled.

28. The MEP notes that when both conditions in paragraph 26 of this cover note are met, uncertainty related to the selection of the disturbance and climate scenarios does not have any implications for the solvency of the Reversal Risk Buffer Pool Account.

3.4.1. Alignment with the fNRB Tool

29. For each of the reversal risk types listed in paragraph 24 of this cover note, the draft methodological tool provides default values for reversal risk factors. To align with the administrative boundaries used in the “Methodological tool: Fraction of non-renewable biomass” (A6.4-AMT-009) (hereinafter referred to as the “fNRB Tool”), [15] the draft methodological tool provides default values at each of the following geographic levels:

(a) Multi-national;

(b) National; and

(c) Subnational.

30. To align with the requirements of the fNRB Tool and to simplify the application and verification of this draft methodological tool, activity participants are required to apply the same geographic level of analysis selected for the fNRB Tool, as directed by the applicable mechanism methodology (see paragraph 15(c)).

31. The tables providing default values for reversal risk factors and reversal risk reduction factors cover the same jurisdictions as are listed in version 01.0 of the fNRB Tool. At the national level, values are provided for all but six countries. Four of the countries have an fNRB value of 1% or less (Djibouti, Iraq, Jordan, and Turkmenistan) while two have an fNRB value of 30% (Eritrea) and 65% (Mauritania). As indicated in the draft methodological tool, Article 6.4 activities that select a national fNRB value and do not have corresponding national default values for reversal risk factors shall select sub-national or multi-national values in this draft methodological tool (see paragraph 16).

3.4.2. Natural reversal risks

32. To reflect the best available science and to ground the determination of natural reversal risk factors in robust evidence, consistent with paragraph 23 of Decision 20/CMA.7, the MEP proposes to determine natural reversal risk factors using an analysis of global historical forest disturbance rates that is projected into the future, based on a peer-reviewed academic method that has been extended to apply to the Article 6.4

[15] See https://unfccc.int/sites/default/files/resource/A6.4-AMT-009-v01.0.pdf.

mechanism's global context. The methods employed to determine natural reversal risk factors account for forest disturbances by addressing:

(a) The exposure of forest carbon to reversal risks, as informed by existing above-ground and below-ground forest carbon stocks in a baseline year;

(b) The probability of a disturbance, as informed by the historical record of global satellite data documenting stand-clearing disturbances;

(c) The severity of a disturbance, as informed by an academic literature analysis that analyses the severity of forest carbon losses from disturbances in tropical forests separately from disturbances in temperate and boreal forests and calculates scenarios for different combinations of disturbance scenarios; and

(d) The use of a lower-emission climate scenario (SSP2-4.5[16]) and a higher-emission climate scenario (SSP5-8.5[17]) to model climate-change-related impacts on forest growth rates and disturbances due to natural reversal risks.

33. Natural reversal risk calculations were initially performed at the resolution of 8 km x 8 km grid cells with global forest coverage. Individual grid cells were then aggregated to the level of subnational, national, and multi-national boundaries following the same geographic definitions as used in the fNRB Tool (see paragraph 29 of this cover note). Aggregation was performed as a weighted average based on existing forest carbon stocks for each grid cell within each applicable subnational, national, and multi-national boundary.

34. Full methodological details and supporting data are available in two publications. The analytical method used is the "absolute reversal" method from Wu et al. (2026)[18] with global data and methods documented in Appendix 2 and results calculated across nine disturbance scenarios and two climate scenarios.

35. The MEP deliberated the choice of using disturbance scenarios and climate scenarios to select default values for natural reversal risk factors. The MEP proposes to choose:

(a) The "tr55bt716" disturbance scenario, which represents a central estimate of calculated reversal risk factors in Appendix 2; and

(b) The SSP2-4.5 climate scenario, noting that Appendix 2 finds that reversal risks exhibit "similar magnitudes and spatial patterns under the two climate scenarios."

36. The MEP considers that these proposed scenarios are appropriate in the context of Article 6.4 activities reducing non-renewable biomass consumption because these mechanism methodologies are not expected to require activity participants to monitor, report, or remediate any reversals that may occur, pursuant to flexibility provisions provided in section 5 of the Reversals Standard, and the A6.4ERs contributed to the reversal risk buffer pool account are expected to be immediately cancelled. As a result, the MEP notes that uncertainty related to the selection of the disturbance and climate scenarios does not

[16] "SSP" refers to the Shared Socio-economic Pathway, describing the socio-economic trends underlying the scenario. SSP2-4.5 refers to the intermediate greenhouse gas emissions scenario, where compared to 1850 – 1900, global surface temperature averaged over 2081 – 2100 is very likely to be higher by 2.1 ^{o}C to 3.5 ^{o}C.

[17] "SSP5-8.5" refers to the very high greenhouse gas emissions scenario, where compared to 1850-1900, global surface temperature averaged over 2081 – 2100 is very likely to be higher by 3.3 ^{o}C to 5.7 ^{o}C.

[18] See https://doi.org/10.1038/s41586-026-10571-y.

have any implications for the solvency of the reversal risk buffer pool account (as indicated above in paragraph 28 of this cover note).

37. The MEP was unable to identify any examples of jurisdiction-wide natural reversal risk mitigation measures at the subnational, national, or multi-national levels. Accordingly, the MEP determined that natural reversal risk mitigation factors for activities that reduce non-renewable biomass consumption should be set to zero by default. They are therefore not included in the calculation of natural reversal risk ratings in this version of the draft methodological tool (see paragraph 21 of this draft methodological tool).

38. In considering how this approach compares to best practices in other settings, the MEP assessed but was unable to identify any explicit data and methods used to determine natural reversal risk factors in other carbon crediting mechanisms. The MEP also observes that the academic literature includes findings that buffer pools in some existing carbon crediting programs may not be adequately sized and do not reflect geographic variation in natural reversal risks.[19]

3.4.3. Human-induced reversal risks

39. Unlike natural reversal risks, for which historical data and forward-looking biophysical modelling can provide reliable analytical insights, human-induced reversal risks depend on a variety of factors that may depart substantially from historical conditions. The MEP was unable to identify any peer-reviewed studies or other analytical literature that provided a clear empirical or analytical basis for projecting human-induced reversal risks, assessing human-induced reversal risk mitigation measures, or estimating associated reversal risk reduction factors.

40. In the absence of a clear empirical or analytical basis for determining these parameters, the MEP requests feedback from stakeholders on how to determine default values for:

    (a) Human-induced reversal risk factors at the multi-national, national, and subnational levels (which would be listed in Table 1, Table 2, and Table 3 in Appendix 1)[20];

    (b) Human-induced reversal risk mitigation measures and their associated reversal risk reduction factors at the multi-national, national, and subnational levels (which would be listed in Table 1, Table 2, and Table 3 in Appendix 1);

41. The MEP welcomes feedback from stakeholders on:

    (a) How these default values should be determined, including the analytical basis for their selection as well as specific numerical default values for consideration; and

    (b) Whether these factors should vary across geography, along with appropriate justification for stakeholders' views.

[19] See, e.g., Anderegg, W.R.L. et al. (2025), Current Forest Carbon Offset Buffer Pool Contributions Do Not Adequately Insure Against Disturbance-Driven Carbon Losses, *Global Change Biology* 31, e70251, https://doi.org/10.1111/gcb.70251; Haya, B.K. et al. (2023), Comprehensive review of carbon quantification by improved forest management offset protocols, *Frontiers in Forests and Global Change*, 6, 958879, https://doi.org/10.3389/ffgc.2023.958879; Wu, C. et al. (2026), Forest carbon protocols underestimate climate-driven carbon loss risks, *Nature* 654, 107-113, https://doi.org/10.1038/s41586-026-10571-y.

[20] The default values provided for natural reversal risk factors for Article 6.4 activities that reduce non-renewable biomass consumption are calculated using the ""tr55bt716" disturbance scenario and the "SSP2-4.5" climate scenario, as documented in this appendix.

3.5. Calculation of $F_{buffer,i,t}$

42. Calculating $F_{buffer,i,t}$ requires a procedure to combine the reversal risk ratings for natural reversal risks and human-induced reversal risks. The MEP notes that the appropriate procedure for combining these parameters depends on how the parameters are selected and whether they are statistically independent of one another.

43. For this public consultation, the MEP initially proposes to add together the reversal risk ratings for natural reversal risks and human-induced reversal risks (see paragraph 17). The MEP notes that this approach may make sense if the terms are statistically independent, which depends on the ultimate approach that is selected for determining default values for human-induced reversal risks and reversal risk reduction factors (see section 3.4.3 of this cover note). In contrast, it may be necessary to account for any applicable statistical dependence with a different approach.

44. The MEP welcomes feedback from stakeholders on:

    (a) Whether it is appropriate to assume statistical independence between natural reversal risks and human-induced reversal risks;

    (b) How natural and human-induced reversal risk ratings should be combined if they are statistically dependent or originate from different probability distributions, as applicable; and

    (c) How any proposed approaches for calculating default values for human-induced reversal risks or human-induced reversal risk reduction factors relate to any proposed approaches for how to calculate $F_{buffer,i,t}$.

3.6. Maximum reversal risk ratings

45. As referenced above in paragraph 5(a) of this cover note, the Supervisory Body has mandated the MEP to recommend whether upper limits are needed for the overall reversal risk rating or specific risk factors. The MEP understands that an upper limit would restrict eligibility by prohibiting Article 6.4 activities from earning A6.4ERs where their overall reversal risk rating or applicable reversal risk factor exceeds such a limit.

46. The MEP proposes to not recommend or apply an upper limit for reversal risk ratings for activities that reduce non-renewable biomass consumption (see paragraph 18), without prejudice to what the MEP might recommend with respect to future applications of this draft methodological tool to other Article 6.4 activity types.

47. The MEP welcomes feedback from stakeholders on whether it is appropriate to not to apply upper limit for reversal risk ratings for activities that reduce non-renewable biomass consumptions, along with appropriate justification for stakeholders' views.

3.7. Guidance on negligible reversal risks

48. Paragraph 3(g) of version 01.0 the Reversals Standard defines a negligible risk of reversal as follows:

    "A risk of reversal that would result in a loss of no more than a maximum percentage to be specified in methodologies on the basis of guidance to be developed in the reversal risk assessment tool of all the A6.4ERs issued with respect to the total emission reductions and/or net removals achieved by the activity during its active crediting period, calculated

over a 100-year timeframe starting from no earlier than the end of the last active crediting period".

49. MEP notes that the Reversals Standard directs mechanism methodologies to define a negligible risk of reversal, expressed as a maximum percentage and based on guidance provided in the draft methodological tool. However, the MEP also notes that such guidance may not be relevant to activities that reduce non-renewable biomass consumption. A determination that an Article 6.4 activity has a negligible risk of reversal is primarily relevant where an Article 6.4 activity seeks to terminate post-crediting monitoring obligations, consistent with paragraph 28(a) of version 01.0 of the Removals Standard and section 4.2.2 of version 01.0 of the Information Note. Under paragraphs 13 and 15 of version 01.0 of the Reversals Standard, mechanism methodologies addressing non-renewable biomass consumption may request alternatives to post-crediting monitoring. If a mechanism methodology proposed an exemption from this requirement and the Supervisory Body approved that exemption, there would be no practical need for an activity participant to demonstrate that the corresponding Article 6.4 activity has a negligible risk of reversal.

50. The MEP also notes that paragraph 39(b) of version 01.0 of the Removals Standard requires the reversal risk rating derived from the draft methodological tool to "inform the identification of A6.4ERs with a negligible risk of reversal" and that any such A6.4ERs be "tagged" accordingly in the mechanism registry. If a mechanism methodology does not provide a definition of a negligible risk of reversal, then no A6.4ERs issued under that mechanism methodology will be tagged as such in the mechanism registry.

51. This draft methodological tool may be updated in the future to provide additional guidance relevant to the determination of a negligible risk of reversal. In the meantime, the draft methodological tool can be used to calculate a reversal risk rating for Article 6.4 activities that reduce non-renewable biomass consumption, and mechanism methodologies may define a negligible risk of reversal using that information.

4. Impacts

52. This draft methodological tool will enable activity participants to:

(a) Calculate the parameter $F_{buffer,i,t}$, which is used in mechanism methodologies to determine the number of A6.4ERs to be forwarded to the Reversal Risk Buffer Pool Account, consistent with equation (8) of version 01.0 of the Reversals Standard; and

(b) Determine whether the stored greenhouse gases (or precursors of greenhouse gases) for which A6.4ERs have been issued are at a negligible risk of reversal, as defined in their applicable mechanism methodology.

53. The MEP further notes that the draft methodological tool will support the issuance of A6.4ERs to Article 6.4 activities that involve the reduction of non-renewable biomass consumption (e.g., clean cooking activities) and that have applied to transition from the Clean Development Mechanism to the Article 6.4 mechanism.

5. Subsequent work and timelines

54. The MEP agreed to seek public input from stakeholders on the draft methodological tool. The MEP will consider stakeholders' input and recommend an updated draft of the methodological tool for consideration by the Supervisory Body.

55. The MEP anticipates updating the draft methodological tool to include additional applications in the future. The work has already begun and will continue in parallel to the call for public input on this draft document. Without prejudice to any other potential applications, the MEP's current efforts include applications for:

(a) Forestry;

(b) Subsurface geologic storage; and

(c) Biochar.

56. The MEP notes that future applications may take different approaches from that proposed for activities reducing non-renewable biomass consumption. For example, as referenced above in paragraph 16 of this cover note, future applications may include alternatives to the use of default values for reversal risk factors, depending on the characteristics of the relevant greenhouse gas reservoirs and activity types.

57. The MEP notes that, consistent with its mandatory procedures, any additional updates will undergo separate calls for public input, such that interested stakeholders will be provided with an opportunity to comment on any future developments that are not included in the initial version of this draft methodological tool (e.g., to expand the eligibility of this draft methodological tool to different greenhouse gas reservoirs or activity types).

6. Recommendations to the Supervisory Body

58. Not applicable (document is published for a call for public input).

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1. Introduction

1.1. Scope

1. This methodological tool provides a stepwise approach for conducting a reversal risk assessment under the Article 6.4 mechanism. It applies to project-level Article 6.4 activities, and component projects (CPs) in the case of programmes of activities (PoAs), that are subject to reversal risks.

2. This methodological tool establishes requirements to determine the parameter in Table 1, which is used to determine the number of A6.4ERs to be forwarded to the Reversal Risk Buffer Pool Account:[1]

Table 1. Parameter determined

Parameter	SI Unit	Description
$F_{buffer,i,t}$	Dimensionless	The fraction of the net enhancement in storage of a greenhouse gas or a precursor in reservoir *i*, resulting from the Article 6.4 activity over the period of time covered by monitoring report *t*, as determined by the reversal risk assessment tool, and used to determine the number of A6.4ERs to be forwarded to the reversal risk buffer pool account.[2]

1.2. Entry into force and validity

3. This methodological tool enters into force on DD Month YYYY.

4. This methodological tool remains valid for five years, until DD Month YYYY, unless an earlier date applies if the methodological tool is revised or withdrawn in accordance with the "Procedure: Development, Revision and Clarification of Methodologies and Methodological Tools" (A6.4-PROC-METH-001).[3]

2. Definitions

5. The following general terms apply in this methodological tool:

(a) "Shall" is used to indicate requirements that must be followed;

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1 For context, the Reversals Standard applies this parameter only to the net change in storage of a greenhouse gas (or a precursor to a greenhouse gas) in a greenhouse gas reservoir *i*, separate from the net change in emissions from sources other than the greenhouse gas reservoir *i*. Additional information is provided in section 6 of the Reversals Standard.

2 This definition is the same as in equation (8) of version 01.0 of the Reversals Standard.

3 See https://unfccc.int/sites/default/files/resource/A6.4-PROC-METH-001.pdf.

(b) "Should" is used to indicate that, among several options, one course of action is recommended as particularly suitable; and

(c) "May" is used to indicate what is permitted.

6. The following methodological terms and definitions apply in this methodological tool:

(a) **Human-induced reversal risk:** Reversal risk arising from human-induced factors (e.g., as applicable, activity finance and management; asset ownership; rising opportunity costs; regulatory uncertainty and social instability; political, governance, and legal risks; acts of terrorism, crime and war);[4]

(b) **Natural reversal risk:** Reversal risk from natural disturbances and extreme events (e.g., as applicable, fires, pests, droughts, hurricanes, floods, landslides, earthquakes, volcanic eruptions, and geologic faults and fractures);[5]

(c) **Reversal risk:** The risk of reversal of greenhouse gases or their precursors stored in one or more applicable greenhouse gas reservoir(s);

(d) **Reversal risk factor:** The estimated loss of credited greenhouse gas stocks over a 100-year period that is attributable to an applicable reversal risk type in an applicable greenhouse gas reservoir;

(e) **Reversal risk rating:** The reversal risk factor associated with a given greenhouse gas reservoir and reversal risk type(s), adjusted for any reversal risk reduction factor(s), as applicable;[6]

(f) **Reversal risk mitigation measure:** An intervention undertaken or demonstrated by the Article 6.4 activity that reduces or eliminates a reversal risk factor;[7]

(g) **Reversal risk reduction factor:** A dimensionless parameter that reflects the reduction in reversal risk where an appropriate reversal risk mitigation measure is present; and

(h) **Reversal risk type:** A category or individual driver of reversal risks.[8]

7. Furthermore, the terms in "Glossary: Article 6.4 mechanism terms" (A6.4-GLOS-GOV-001) and the definitions and terms in the methodological tools referred to in section 3 shall apply.

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[4] This definition is intended to align with paragraphs 37(a) and 37(b) of version 01.0 of the Removals Standard.

[5] This definition is intended to align with paragraph 37(c) of version 01.0 the Removals Standard.

[6] In certain circumstances, the reversal risk factor may inherently account for appropriate reversal risk mitigation measures and therefore may not require an adjustment to the reversal risk factor to produce a reversal risk rating. For example, the site screening criteria for geologic storage of CO_2 under a regulatory framework is a form of reversal risk reduction for CO_2 leakage from natural seismic activity. If these effects are already incorporated into the reversal risk factor, no additional adjustments are needed.

[7] For example, tree thinning practices can reduce the risk of wildfire; proper site selection and reservoir characterization practices for subsurface geologic carbon storage projects can reduce the risk of induced seismicity; and third-party financial guarantees can reduce the risk of insolvency.

[8] For example, wildfire, induced seismicity, or insolvency.

3. Normative and informative references

8. The following documents are indispensable for the application of this methodological tool. When applying this methodological tool, a valid version of the documents listed below shall be used:

(a) “Standard: Addressing non-permanence and reversals in mechanism methodologies” (A6.4-STAN-METH-007) (hereinafter referred to as the “Reversals Standard”);[9] and

(b) “Glossary: Article 6.4 mechanism terms” (A6.4-GLOS-GOV-001).[10]

9. The following documents provide supporting information that may assist in the application of this methodological tool:

(a) “Methodological tool: Fraction of non-renewable biomass” (A6.4-AMT-009) (hereinafter referred to as the “fNRB Tool”);[11] and

(b) Wu, C. et al. (2026). Forest carbon protocols underestimate climate-driven carbon loss risks, *Nature* 654, 107-113.[12]

4. Applicability

4.1. General requirements

10. This methodological tool is applicable to Article 6.4 activities where its use is explicitly referenced in the applicable mechanism methodology.

11. This methodological tool is only applicable where the referring mechanism methodology specifies:

(a) All applicable greenhouse gas reservoir(s), consistent with paragraph 11 of the Reversals Standard; and

(b) That this methodological tool shall be applied to each applicable greenhouse gas reservoir *i* to determine the parameter $F_{buffer,i,t}$.

12. This version of the methodological tool is only applicable to the following types of activities:[13]

(a) Article 6.4 activities reducing non-renewable biomass consumption.

13. Mechanism methodologies applying this methodological tool shall use the approaches set out in this methodological tool and shall not introduce alternative approaches, except where this methodological tool expressly provides that specified elements may be defined by the mechanism methodology and such definitions are consistent with this methodological tool.

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[9] See https://unfccc.int/sites/default/files/resource/A6.4-STAN-METH-007.pdf.

[10] See https://unfccc.int/sites/default/files/resource/A6.4-Glossary.pdf.

[11] See https://unfccc.int/sites/default/files/resource/A6.4-AMT-009-v01.0.pdf.

[12] See https://doi.org/10.1038/s41586-026-10571-y.

[13] This methodological tool will be amended in the future to also cover other types of Article 6.4 activities.

14. This methodological tool has additional applicability conditions that vary according to the activity type and greenhouse gas reservoir(s) involved in an Article 6.4 activity, as specified in the subsections below.

4.2. Article 6.4 activities reducing non-renewable biomass consumption

15. In the case of activities reducing non-renewable biomass consumption, this methodological tool is only applicable where the referring mechanism methodology:

(a) Identify a source of non-renewable biomass as an applicable greenhouse gas reservoir, consistent with paragraph 11 of the Reversals Standard;[14]

(b) Identify a geographic area or region, rather than a specific parcel or plantation, as the source of non-renewable biomass consumption that is reduced by an Article 6.4 activity; [15] and

(c) Specify, for the purposes of applying the fNRB Tool to determine the fraction of non-renewable biomass, whether activity participants shall apply a sub-national, national, or multi-national default value for the fNRB Tool or the conditions for selecting among these alternatives, consistent with paragraph 10 of version 1.0 of the fNRB Tool.

5. Reversal risk assessment

5.1. Article 6.4 activities reducing non-renewable biomass consumption

16. Activity participants shall assess reversal risks for each project-level Article 6.4 activity and for each component project (CP) in the case of a programme of activities (PoA), using the same geographic level selected for the application of the fNRB Tool (i.e., subnational, national, or multi-national level) and subject to the following conditions:

(a) If default values are not available in this methodological tool for the selected subnational level, activity participants shall assess reversal risks using the national level; and

If default values are not available for the selected national level in this methodological tool, activity participants shall assess reversal risks at either the subnational or multi-national levels, following any applicable guidance in the mechanism methodology for selecting the geographic level of analysis in the fNRB Tool.

17. The parameter $F_{buffer,i,t}$ shall be calculated as follows:

$$F_{buffer,i,t} = Rating_{natural,i} + Rating_{human,i}$$ Equation (1)

[14] For example, to demonstrate that a forest is a source of non-renewable biomass, activity participants may identify a region where a forest is located rather than a specific forest parcel.

[15] For activities reducing non-renewable biomass consumption, reduced loss of non-renewable biomass is expected to occur across the relevant geographic area or region, rather than be attributable to a specific parcel of land or plantation.

Where:

$F_{buffer,i,t}$	=	The fraction of the net enhancement in storage of a greenhouse gas or a precursor in reservoir *i*, resulting from the Article 6.4 activity over the period covered by monitoring report *t*, as determined by this methodological tool and used to determine the number of A6.4ERs to be forwarded to the Reversal Risk Buffer Pool Account
$Rating_{natural,i}$	=	The reversal risk rating for all natural reversal risks with respect to greenhouse gas reservoir *i*
$Rating_{human,i}$	=	The reversal risk rating for all human-induced reversal risks with respect to greenhouse gas reservoir *i*
i	=	The greenhouse gas reservoir identified by the applicable mechanism methodology
t	=	The monitoring report for which this methodological tool is applied

18. If the parameter $F_{buffer,i,t}$ is greater than 1 as per equation (1), then activity participants shall set the parameter equal to 1. There is no upper limit on the parameter for this activity type.

Question 01: The MEP seeks feedback on how to combine natural and human-induced reversal risk factors. Please note that the MEP will consider whether this approach or any alternatives may be more appropriate for combining natural and human-induced reversal risk ratings, subject to how these terms are calculated in the revised draft methodological tool. The MEP notes that reversal risk ratings may be additive if they are statistically independent and from the same probability distribution; an alternative approach may be more appropriate if natural and human-induced reversal risk ratings are statistically dependent. Stakeholders are requested to provide comments on how any recommendations about the determination of human-induced reversal risks or human-induced reversal risk reduction factors should inform the calculation of $F_{buffer,i,t}$.

5.1.1. Natural reversal risks

19. The reversal risk rating for all natural reversal risks shall be calculated as follows:

$$Rating_{natural,i} = R_{wildfire,i} + R_{other,i}$$

Equation (2)

Where:

$Rating_{natural,i}$	=	The reversal risk rating for all natural reversal risks with respect to greenhouse gas reservoir *i*
$R_{wildfire,i}$	=	The reversal risk factor for wildfire with respect to greenhouse gas reservoir *i*, as specified in paragraph 20
$R_{other,i}$	=	The reversal risk factor for all other natural reversal risks with respect to greenhouse gas reservoir *i*, as specified in paragraph 20
i	=	The greenhouse gas reservoir identified in paragraph 15(a)

20. To determine reversal risk ratings for wildfire ($R_{wildfire,I}$) and all other natural reversal risks ($R_{other,I}$), activity participants shall use the default values provided in Appendix 1 for the

multinational (Table 1), national (Table 2) and sub-national (Table 3) levels, as applicable. These values include the effects of climate change impacts on reversal risk factors. [16]

21. Reversal risk reduction factors for all natural reversal risks shall be deemed to be zero by assumption and are therefore not included in equation (2).[17]

5.1.2. Human-induced reversal risks

22. The reversal risk rating for all human-induced reversal risks shall be calculated as follows:

$$Rating_{human,i} = R_{human,i} \times \left(1 - M_{human,i}\right)$$

Equation (3)

Where:

$Rating_{human,i}$	=	The reversal risk rating for all human-induced reversal risks with respect to greenhouse gas reservoir *i*
$R_{human,i}$	=	The reversal risk factor for all human-induced reversal risks with respect to greenhouse gas reservoir *i*, as specified in paragraph 0
$M_{human,i}$	=	The reversal risk reduction factor for human-induced reversal risk mitigation measures with respect to greenhouse gas reservoir *i*, as specified in paragraph 0
i	=	The greenhouse gas reservoir identified in paragraph paragraph 15(a)

To determine reversal risk factors for human-induced reversal risks ($R_{human,i}$) and reversal risk reduction factors for human-induced reversal risks ($M_{human,i}$), activity participants shall use the default values provided in appendix 1 for the multi-national (Table 1), national (Table 2) and subnational (Table 3) levels, as applicable.

Question 02: On what basis should the MEP determine default values for human-induced reversal risks? What is an appropriate choice for these values? Should the values vary across jurisdictions (e.g., to reflect variation in relevant factors related to land use and land-use change), and why or why not?

Question 03: On what basis should the MEP determine default values for human-induced reversal risk reduction factors? What is an appropriate choice for these values? Should the values vary across jurisdictions (e.g., to reflect variation in relevant factors related to land use and land-use change), and why or why not?

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[16] These climate impacts are intended to reflect the direction in paragraph 37(d) of the Removals Standard. Reversal risk factors are calculated using the "absolute reversal" method from Wu et al. (2026), using global data and methods as documented in Appendix 2 for the "tr55bt716" disturbance scenario under the "SSP2-4.5" climate scenario. This approach, which reflects the best available estimate of natural reversal risks, is appropriate for Article 6.4 activities that reduce non-renewable biomass consumption where the A6.4ERs contributed to the reversal risk buffer bool account are to be immediately cancelled. In other contexts, different scenarios may be considered in future versions of this tool to ensure the sufficiency of the reversal risk buffer pool account.

[17] The MEP is not aware of any jurisdiction-wide efforts to implement reversal risk mitigation measures at the subnational, national, or multi-national levels.

Appendix 1. Default values for Article 6.4 activities reducing non-renewable biomass consumption

1. This appendix contains the default values used for the reversal risk assessment of Article 6.4 activities that reduce non-renewable biomass consumption, as specified in section 5.

Table 1. Reversal risk factors and reversal risk reduction factors (multi-national)

Region	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Asia	2.1	24.6		
Latin America	7.1	24.9		
Sub-Saharan Africa	0.2	12.3		

Table 2. Reversal risk factors and reversal risk reduction factors (national)

Country	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Afghanistan	8.5	1.6		
Angola	0.1	11.4		
Armenia	2.5	14.2		
Azerbaijan	3.4	18.5		
Bangladesh	0.5	27.9		
Benin	0.0	9.7		
Bhutan	1.8	11.2		
Bolivia	11.2	22.5		
Botswana	0.0	2.9		
Brazil	7.9	26.2		
Burkina Faso	0.0	9.8		
Burundi	0.0	10.8		
Cambodia	0.5	26.8		
Cameroon	0.1	25.1		
Central African Republic	0.4	14.7		
Chad	0.0	9.0		
China	3.0	25.1		

Country	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Colombia	3.2	25.7		
Costa Rica	1.3	24.7		
Cote d'Ivoire	0.0	12.9		
Republic of the Congo	2.0	29.0		
Democratic Republic of the Congo	0.7	27.3		
Djibouti	N/A	N/A		
Dominican Republic	4.4	12.9		
Ecuador	2.1	24.7		
Equatorial Guinea	0.2	30.0		
Eritrea	N/A	N/A		
Eswatini	0.2	7.2		
Ethiopia	0.1	8.9		
Gabon	0.4	32.8		
Gambia	0.0	6.1		
Georgia	1.5	14.6		
Ghana	0.0	13.2		
Guatemala	5.3	23.9		
Guinea	0.0	10.3		
Guinea-Bissau	0.0	9.2		
Guyana	6.7	34.9		
Haiti	0.8	11.9		
Honduras	2.6	20.2		
India	0.7	21.8		
Indonesia	2.4	24.2		
Iran	4.7	16.6		
Iraq	N/A	N/A		
Jamaica	0.7	20.9		
Jordan	N/A	N/A		
Kazakhstan	4.9	11.0		
Kenya	0.1	7.3		
Kyrgyzstan	4.6	6.4		

Country	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Lao People's Democratic Republic	0.0	22.3		
Liberia	0.3	29.6		
Madagascar	0.6	10.5		
Malawi	0.0	7.9		
Malaysia	0.5	25.6		
Mali	0.0	6.2		
Mauritania	N/A	N/A		
Mexico	3.6	13.3		
Mongolia	15.8	3.9		
Mozambique	0.1	7.9		
Myanmar	0.3	26.5		
Namibia	0.1	4.6		
Nepal	2.0	21.0		
Nicaragua	1.6	22.5		
Niger	0.0	7.7		
Nigeria	0.0	12.8		
Pakistan	3.1	5.8		
Panama	5.1	27.8		
Papua New Guinea	2.5	19.4		
Peru	2.9	33.0		
Philippines	0.4	25.4		
Rwanda	0.0	11.4		
Senegal	0.0	5.5		
Sierra Leone	0.0	13.7		
Somalia	0.0	3.8		
South Africa	0.8	5.1		
South Sudan	0.0	6.7		
Sri Lanka	0.3	30.2		
Sudan	0.0	5.2		
Syrian Arab Republic	17.2	23.4		
Tajikistan	12.1	8.8		
Thailand	0.2	26.9		
Timor-Leste	1.8	35.4		

Country	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Togo	0.1	10.7		
Türkiye	3.1	25.6		
Turkmenistan	NA	NA		
Uganda	0.0	9.8		
United Republic of Tanzania	0.0	8.7		
Uzbekistan	13.0	10.3		
Viet Nam	0.3	28.0		
Zambia	0.1	8.7		
Zimbabwe	0.0	4.8		

Table 3. Reversal risk factors and reversal risk reduction factors (subnational)

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Afghanistan	Badakhshan	N/A	N/A		
Afghanistan	Badghis	N/A	N/A		
Afghanistan	Baghlan	N/A	N/A		
Afghanistan	Balkh	N/A	N/A		
Afghanistan	Bamyan	N/A	N/A		
Afghanistan	Daykundi	N/A	N/A		
Afghanistan	Farah	N/A	N/A		
Afghanistan	Faryab	N/A	N/A		
Afghanistan	Ghazni	N/A	N/A		
Afghanistan	Ghor	N/A	N/A		
Afghanistan	Hilmand	N/A	N/A		
Afghanistan	Hirat	N/A	N/A		
Afghanistan	Jawzjan	N/A	N/A		
Afghanistan	Kabul	N/A	N/A		
Afghanistan	Kandahar	N/A	N/A		
Afghanistan	Kapisa	N/A	N/A		
Afghanistan	Khost	5.3	0.8		
Afghanistan	Kunar	8.4	1.7		
Afghanistan	Kunduz	N/A	N/A		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Afghanistan	Laghman	N/A	N/A		
Afghanistan	Logar	N/A	N/A		
Afghanistan	Nangarhar	11.1	0.8		
Afghanistan	Nimroz	N/A	N/A		
Afghanistan	Nuristan	8.9	1.6		
Afghanistan	Paktika	N/A	N/A		
Afghanistan	Paktya	5.0	1.0		
Afghanistan	Panjshir	N/A	N/A		
Afghanistan	Parwan	N/A	N/A		
Afghanistan	Samangan	N/A	N/A		
Afghanistan	Sari Pul	N/A	N/A		
Afghanistan	Takhar	N/A	N/A		
Afghanistan	Uruzgan	N/A	N/A		
Afghanistan	Wardak	N/A	N/A		
Afghanistan	Zabul	N/A	N/A		
Angola	Bengo	0.2	15.3		
Angola	Benguela	0.0	9.1		
Angola	Bié	0.0	10.6		
Angola	Cabinda	0.1	32.9		
Angola	Cuando Cubango	0.1	6.7		
Angola	Cuanza Norte	0.1	17.1		
Angola	Cuanza Sul	0.0	10.3		
Angola	Cunene	0.0	5.0		
Angola	Huambo	0.0	9.5		
Angola	Huíla	0.0	7.6		
Angola	Luanda	0.1	7.7		
Angola	Lunda Norte	0.0	15.7		
Angola	Lunda Sul	0.1	11.9		
Angola	Malanje	0.0	12.7		
Angola	Moxico	0.3	9.8		
Angola	Namibe	0.0	8.0		
Angola	Uíge	0.1	18.0		
Angola	Zaire	0.3	11.0		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Armenia	Aragatsotn	2.3	14.3		
Armenia	Ararat	2.3	20.0		
Armenia	Armavir	N/A	N/A		
Armenia	Yerevan	N/A	N/A		
Armenia	Gegharkunik	3.5	13.7		
Armenia	Kotayk	2.2	12.8		
Armenia	Lori	2.0	11.8		
Armenia	Shirak	N/A	N/A		
Armenia	Syunik	N/A	N/A		
Armenia	Tavush	2.3	16.8		
Armenia	Vayots Dzor	0.5	9.2		
Azerbaijan	Absheron	2.2	17.5		
Azerbaijan	Aran	2.9	27.7		
Azerbaijan	Daglig-Shirvan	2.2	17.8		
Azerbaijan	Ganja-Qazakh	3.6	15.4		
Azerbaijan	Kalbajar-Lachin	N/A	N/A		
Azerbaijan	Lankaran	2.5	13.5		
Azerbaijan	Nakhchivan	N/A	N/A		
Azerbaijan	Quba-Khachmaz	3.9	19.3		
Azerbaijan	Shaki-Zaqatala	4.0	15.9		
Azerbaijan	Yukhari-Karabakh	N/A	N/A		
Bangladesh	Barisal	3.5	24.5		
Bangladesh	Chittagong	0.4	36.4		
Bangladesh	Dhaka	1.4	13.9		
Bangladesh	Khulna	1.8	16.0		
Bangladesh	Mymensingh	0.4	12.9		
Bangladesh	Rajshahi	N/A	N/A		
Bangladesh	Rangpur	0.5	19.0		
Bangladesh	Sylhet	0.3	15.7		
Benin	Alibori	0.0	8.9		
Benin	Atakora	0.0	7.2		
Benin	Atlantique	0.1	10.8		
Benin	Borgou	0.0	10.0		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Benin	Collines	0.0	11.2		
Benin	Donga	0.0	10.2		
Benin	Kouffo	0.0	10.5		
Benin	Littoral	N/A	N/A		
Benin	Mono	0.9	11.5		
Benin	Ouémé	0.0	9.4		
Benin	Plateau	0.0	11.0		
Benin	Zou	0.0	11.1		
Bhutan	Bumthang	2.6	9.7		
Bhutan	Chhukha	1.8	10.4		
Bhutan	Dagana	1.5	7.1		
Bhutan	Gasa	1.6	5.7		
Bhutan	Haa	1.7	11.8		
Bhutan	Lhuentse	1.6	8.3		
Bhutan	Monggar	0.9	13.7		
Bhutan	Paro	3.3	13.0		
Bhutan	Pema Gatshel	0.4	9.6		
Bhutan	Punakha	2.9	10.6		
Bhutan	Samdrup Jongkhar	0.6	11.2		
Bhutan	Samtse	1.1	10.2		
Bhutan	Sarpang	0.5	7.8		
Bhutan	Thimphu	3.3	11.0		
Bhutan	Trashi Yangtse	1.1	12.2		
Bhutan	Trashigang	0.9	15.6		
Bhutan	Trongsa	2.5	13.5		
Bhutan	Tsirang	1.6	16.5		
Bhutan	Wangdue Phodrang	3.0	12.1		
Bhutan	Zhemgang	0.7	10.3		
Bolivia (Plurinational State of)	Beni	10.5	22.9		
Bolivia (Plurinational State of)	Chuquisaca	4.6	14.2		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Bolivia (Plurinational State of)	Cochabamba	4.7	28.8		
Bolivia (Plurinational State of)	La Paz	15.0	24.0		
Bolivia (Plurinational State of)	Oruro	N/A	N/A		
Bolivia (Plurinational State of)	Pando	8.0	37.9		
Bolivia (Plurinational State of)	Potosí	1.4	2.3		
Bolivia (Plurinational State of)	Santa Cruz	1.3	1.5		
Bolivia (Plurinational State of)	Tarija	4.8	14.0		
Botswana	Central	0.0	2.6		
Botswana	Chobe	0.0	3.1		
Botswana	Francistown	0.1	4.1		
Botswana	Gaborone	0.1	2.4		
Botswana	Ghanzi	N/A	N/A		
Botswana	Jwaneng	N/A	N/A		
Botswana	Kgalagadi	N/A	N/A		
Botswana	Kgatleng	0.2	3.9		
Botswana	Kweneng	0.2	5.3		
Botswana	Lobatse	N/A	N/A		
Botswana	North-East	0.1	2.3		
Botswana	North-West	0.1	3.1		
Botswana	Selibe Phikwe	N/A	N/A		
Botswana	South-East	0.1	3.0		
Botswana	Southern	N/A	N/A		
Botswana	Sowa	N/A	N/A		
Brazil	Acre	1.8	41.1		
Brazil	Alagoas	0.6	9.6		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Brazil	Amapá	6.2	37.2		
Brazil	Amazonas	9.6	32.1		
Brazil	Bahia	2.8	8.6		
Brazil	Ceará	0.8	9.3		
Brazil	Distrito Federal	0.4	9.5		
Brazil	Espírito Santo	1.1	12.2		
Brazil	Goiás	1.0	14.1		
Brazil	Maranhão	4.0	22.3		
Brazil	Mato Grosso	12.1	24.5		
Brazil	Mato Grosso do Sul	1.9	10.6		
Brazil	Minas Gerais	1.3	10.7		
Brazil	Pará	11.3	32.4		
Brazil	Paraíba	0.6	7.1		
Brazil	Paraná	1.5	17.8		
Brazil	Pernambuco	0.6	8.7		
Brazil	Piauí	4.3	9.8		
Brazil	Rio de Janeiro	2.4	14.2		
Brazil	Rio Grande do Norte	0.3	6.7		
Brazil	Rio Grande do Sul	0.9	13.3		
Brazil	Rondônia	7.0	37.9		
Brazil	Roraima	16.4	23.7		
Brazil	Santa Catarina	1.5	21.7		
Brazil	São Paulo	1.8	20.1		
Brazil	Sergipe	0.4	9.0		
Brazil	Tocantins	1.8	14.1		
Burkina Faso	Boucle du Mouhoun	0.0	10.4		
Burkina Faso	Cascades	0.0	9.9		
Burkina Faso	Centre	N/A	N/A		
Burkina Faso	Centre-Est	0.0	9.3		
Burkina Faso	Centre-Nord	N/A	N/A		
Burkina Faso	Centre-Ouest	0.0	9.9		
Burkina Faso	Centre-Sud	0.0	9.7		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Burkina Faso	Est	0.0	2.9		
Burkina Faso	Haut-Bassins	0.0	10.1		
Burkina Faso	Nord	N/A	N/A		
Burkina Faso	Plateau-Central	N/A	N/A		
Burkina Faso	Sahel	N/A	N/A		
Burkina Faso	Sud-Ouest	0.0	10.4		
Burundi	Bubanza	0.0	10.2		
Burundi	Bujumbura Mairie	0.1	12.1		
Burundi	Bujumbura Rural	0.0	11.0		
Burundi	Bururi	0.0	10.2		
Burundi	Cankuzo	0.0	8.9		
Burundi	Cibitoke	0.1	16.7		
Burundi	Gitega	0.0	10.0		
Burundi	Karuzi	0.0	11.1		
Burundi	Kayanza	0.0	11.1		
Burundi	Kirundo	0.0	10.3		
Burundi	Makamba	0.0	10.6		
Burundi	Muramvya	0.0	11.2		
Burundi	Muyinga	0.0	9.9		
Burundi	Mwaro	0.0	11.2		
Burundi	Ngozi	0.0	10.3		
Burundi	Rutana	0.0	10.2		
Burundi	Ruyigi	0.0	10.5		
Cambodia	Bântéay Méanchey	0.1	17.5		
Cambodia	Batdâmbâng	0.6	18.8		
Cambodia	Kâmpóng Cham	0.3	17.3		
Cambodia	Kâmpóng Chhnang	0.1	16.6		
Cambodia	Kâmpóng Spœ	0.1	23.8		
Cambodia	Kâmpóng Thum	0.8	14.8		
Cambodia	Kâmpôt	0.3	19.1		
Cambodia	Kândal	0.3	13.2		
Cambodia	Kaôh Kong	0.4	24.2		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Cambodia	Kep	N/A	N/A		
Cambodia	Krâchéh	0.3	34.6		
Cambodia	Krong Pailin	0.1	28.7		
Cambodia	Krong Preah Sihanouk	0.3	22.0		
Cambodia	Môndól Kiri	0.2	37.5		
Cambodia	Otdar Mean Chey	0.1	30.4		
Cambodia	Phnom Penh	0.2	13.8		
Cambodia	Pouthisat	0.1	22.5		
Cambodia	Preah Vihéar	0.9	33.0		
Cambodia	Prey Vêng	0.5	13.5		
Cambodia	Rôtânôkiri	0.1	30.5		
Cambodia	Siemréab	3.6	22.9		
Cambodia	Stœng Trêng	0.1	26.0		
Cambodia	Svay Rieng	0.4	15.1		
Cambodia	Takêv	0.2	13.7		
Cambodia	Tbong Khmum	0.2	30.1		
Cameroon	Adamaoua	0.0	14.3		
Cameroon	Centre	N/A	N/A		
Cameroon	Est	0.0	2.9		
Cameroon	Extrême-Nord	0.2	8.8		
Cameroon	Littoral	N/A	N/A		
Cameroon	Nord	N/A	N/A		
Cameroon	Nord-Ouest	0.1	16.7		
Cameroon	Ouest	0.0	18.2		
Cameroon	Sud	0.1	32.2		
Cameroon	Sud-Ouest	0.0	10.4		
Central African Republic	Bamingui-Bangoran	0.1	7.1		
Central African Republic	Bangui	3.4	23.7		
Central African Republic	Basse-Kotto	1.6	19.1		
Central African Republic	Haut-Mbomou	0.2	15.3		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Central African Republic	Haute-Kotto	0.1	11.8		
Central African Republic	Kémo	0.6	9.4		
Central African Republic	Lobaye	2.1	30.0		
Central African Republic	Mambéré-Kadéï	0.4	24.8		
Central African Republic	Mbomou	1.0	25.3		
Central African Republic	Nana-Grébizi	0.3	10.8		
Central African Republic	Nana-Mambéré	0.0	13.9		
Central African Republic	Ombella-M'Poko	0.8	14.6		
Central African Republic	Ouaka	0.2	10.9		
Central African Republic	Ouham	0.1	10.8		
Central African Republic	Ouham-Pendé	0.0	11.5		
Central African Republic	Sangha-Mbaéré	1.7	34.8		
Central African Republic	Vakaga	0.0	4.7		
Chad	Barh el Ghazel	N/A	N/A		
Chad	Batha	N/A	N/A		
Chad	Borkou	N/A	N/A		
Chad	Chari-Baguirmi	0.0	9.7		
Chad	Ennedi Est	N/A	N/A		
Chad	Ennedi Ouest	N/A	N/A		
Chad	Guéra	0.0	8.6		
Chad	Hadjer-Lamis	0.0	12.5		
Chad	Kanem	N/A	N/A		
Chad	Lac	0.1	3.1		
Chad	Logone Occidental	0.0	10.1		
Chad	Logone Oriental	0.0	10.6		
Chad	Mandoul	0.0	10.4		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Chad	Mayo-Kebbi Est	0.0	6.8		
Chad	Mayo-Kebbi Ouest	0.0	8.3		
Chad	Moyen-Chari	0.0	9.2		
Chad	Ouaddaï	N/A	N/A		
Chad	Salamat	0.0	6.9		
Chad	Sila	0.0	8.5		
Chad	Tandjilé	0.0	8.8		
Chad	Tibesti	N/A	N/A		
Chad	Ville de N'Djamena	N/A	N/A		
Chad	Wadi Fira	N/A	N/A		
China	Anhui	1.2	32.2		
China	Beijing	4.8	24.3		
China	Chongqing	1.5	26.6		
China	Fujian	1.2	30.1		
China	Gansu	3.2	20.6		
China	Guangdong	0.9	31.8		
China	Guangxi	0.9	35.4		
China	Guizhou	2.4	34.7		
China	Hainan	0.0	33.1		
China	Hebei	5.6	18.7		
China	Heilongjiang	3.2	11.9		
China	Henan	4.1	31.1		
China	Hong Kong	N/A	N/A		
China	Hubei	1.3	32.8		
China	Hunan	1.3	34.8		
China	Jiangsu	0.9	22.4		
China	Jiangxi	1.8	32.3		
China	Jilin	1.8	12.6		
China	Liaoning	0.6	10.0		
China	Macau	N/A	N/A		
China	Nei Mongol	6.6	11.4		
China	Ningxia Hui	5.3	10.9		
China	Qinghai	1.9	5.8		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
China	Shaanxi	2.3	26.6		
China	Shandong	8.6	27.6		
China	Shanghai	0.7	15.4		
China	Shanxi	12.5	19.5		
China	Sichuan	5.5	20.9		
China	Tianjin	N/A	N/A		
China	Xinjiang Uygur	6.6	7.1		
China	Xizang	4.0	15.7		
China	Yunnan	4.0	30.8		
China	Zhejiang	2.0	33.8		
Colombia	Amazonas	9.6	32.1		
Colombia	Antioquia	2.3	24.1		
Colombia	Arauca	1.5	15.9		
Colombia	Atlántico	0.6	20.7		
Colombia	Bogotá	2.2	14.4		
Colombia	Bolívar	2.3	25.0		
Colombia	Boyacá	2.5	17.2		
Colombia	Caldas	1.7	19.4		
Colombia	Caquetá	3.0	28.3		
Colombia	Casanare	1.2	11.5		
Colombia	Cauca	2.5	25.3		
Colombia	Cesar	3.9	17.5		
Colombia	Chocó	3.9	31.0		
Colombia	Córdoba	1.1	23.2		
Colombia	Cundinamarca	1.8	19.1		
Colombia	Guaina	7.6	29.2		
Colombia	Guaviare	3.1	31.8		
Colombia	Huila	2.3	24.5		
Colombia	La Guajira	2.7	21.2		
Colombia	Magdalena	1.3	20.1		
Colombia	Meta	1.9	23.7		
Colombia	Nariño	2.7	25.1		
Colombia	Norte de Santander	3.8	24.2		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Colombia	Putumayo	2.5	32.9		
Colombia	Quindío	0.8	28.0		
Colombia	Risaralda	1.1	25.4		
Colombia	San Andrés	N/A	N/A		
Colombia	Santander	1.9	20.0		
Colombia	Sucre	1.3	19.6		
Colombia	Tolima	1.6	21.4		
Colombia	Valle del Cauca	1.0	22.8		
Colombia	Vaupés	3.4	25.4		
Colombia	Vichada	5.8	24.6		
Congo	Bouenza	0.1	14.3		
Congo	Brazzaville	0.1	10.9		
Congo	Cuvette	3.4	32.3		
Congo	Cuvette-Ouest	2.0	33.8		
Congo	Kouilou	0.2	39.2		
Congo	Lékoumou	0.3	37.0		
Congo	Likouala	4.3	34.4		
Congo	Niari	0.2	28.2		
Congo	Plateaux	0.9	17.3		
Congo	Pointe Noire	N/A	N/A		
Congo	Pool	0.2	12.2		
Congo	Sangha	2.3	35.3		
Costa Rica	Alajuela	0.9	19.1		
Costa Rica	Cartago	1.0	31.5		
Costa Rica	Guanacaste	0.9	21.4		
Costa Rica	Heredia	1.4	27.1		
Costa Rica	Limón	2.1	32.8		
Costa Rica	Puntarenas	1.8	23.3		
Costa Rica	San José	1.1	25.6		
Côte d’Ivoire	Abidjan	N/A	N/A		
Côte d’Ivoire	Bas-Sassandra	0.1	17.3		
Côte d’Ivoire	Comoé	0.0	16.7		
Côte d’Ivoire	Denguélé	0.0	9.9		
Côte d’Ivoire	Gôh-Djiboua	0.0	10.9		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Côte d'Ivoire	Lacs	0.0	10.8		
Côte d'Ivoire	Lagunes	0.0	14.2		
Côte d'Ivoire	Montagnes	0.1	22.4		
Côte d'Ivoire	Sassandra-Marahoué	0.0	11.9		
Côte d'Ivoire	Savanes	0.0	9.9		
Côte d'Ivoire	Vallée du Bandama	0.0	10.3		
Côte d'Ivoire	Woroba	0.0	11.0		
Côte d'Ivoire	Yamoussoukro	0.0	10.0		
Côte d'Ivoire	Zanzan	0.0	11.9		
Democratic Republic of the Congo	Bas-Uele	1.0	33.3		
Democratic Republic of the Congo	Équateur	1.9	39.7		
Democratic Republic of the Congo	Haut-Katanga	0.0	12.2		
Democratic Republic of the Congo	Haut-Lomami	0.0	15.4		
Democratic Republic of the Congo	Haut-Uele	0.0	27.8		
Democratic Republic of the Congo	Ituri	0.0	28.7		
Democratic Republic of the Congo	Kasaï	0.6	31.6		
Democratic Republic of the Congo	Kasaï-Central	0.1	25.1		
Democratic Republic of the Congo	Kasaï-Oriental	0.0	11.0		
Democratic Republic of the Congo	Kinshasa	0.1	9.8		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Democratic Republic of the Congo	Kongo-Central	0.1	14.2		
Democratic Republic of the Congo	Kwango	0.2	17.8		
Democratic Republic of the Congo	Kwilu	0.3	16.9		
Democratic Republic of the Congo	Lomami	0.0	12.5		
Democratic Republic of the Congo	Lualaba	0.0	13.8		
Democratic Republic of the Congo	Mai-Ndombe	1.9	33.5		
Democratic Republic of the Congo	Maniema	0.4	31.6		
Democratic Republic of the Congo	Mongala	3.1	37.0		
Democratic Republic of the Congo	Nord-Kivu	0.0	28.5		
Democratic Republic of the Congo	Nord-Ubangi	2.3	30.8		
Democratic Republic of the Congo	Sankuru	0.6	36.0		
Democratic Republic of the Congo	Sud-Kivu	0.0	29.5		
Democratic Republic of the Congo	Sud-Ubangi	2.7	31.5		
Democratic Republic of the Congo	Tanganyika	0.0	18.0		
Democratic Republic of the Congo	Tshopo	0.8	36.7		

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Democratic Republic of the Congo	Tshuapa	0.7	38.2		
Djibouti	Ali Sabieh	N/A	N/A		
Djibouti	Arta	N/A	N/A		
Djibouti	Dikhil	N/A	N/A		
Djibouti	Djibouti	N/A	N/A		
Djibouti	Obock	N/A	N/A		
Djibouti	Tadjoura	N/A	N/A		
Dominican Republic	Azua	5.9	7.0		
Dominican Republic	Bahoruco	6.0	7.7		
Dominican Republic	Barahona	7.3	7.8		
Dominican Republic	Dajabón	2.5	15.7		
Dominican Republic	Distrito Nacional	N/A	N/A		
Dominican Republic	Duarte	0.9	21.6		
Dominican Republic	El Seibo	0.1	11.5		
Dominican Republic	Espaillat	1.5	13.3		
Dominican Republic	Hato Mayor	0.4	29.9		
Dominican Republic	Independencia	4.7	8.2		
Dominican Republic	La Altagracia	N/A	N/A		
Dominican Republic	La Estrelleta	2.3	10.1		
Dominican Republic	La Romana	N/A	N/A		
Dominican Republic	La Vega	8.6	14.5		
Dominican Republic	María Trinidad Sánchez	0.7	16.1		
Dominican Republic	Monseñor Nouel	5.8	21.1		

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Dominican Republic	Monte Cristi	1.6	11.3		
Dominican Republic	Monte Plata	0.4	18.2		
Dominican Republic	Pedernales	7.3	8.7		
Dominican Republic	Peravia	2.9	18.6		
Dominican Republic	Puerto Plata	1.3	10.1		
Dominican Republic	Salcedo	1.7	14.4		
Dominican Republic	Samaná	0.5	22.2		
Dominican Republic	San Cristóbal	1.2	18.2		
Dominican Republic	San José de Ocoa	4.1	11.2		
Dominican Republic	San Juan	N/A	N/A		
Dominican Republic	San Pedro de Macorís	0.2	15.8		
Dominican Republic	Sánchez Ramírez	0.7	15.0		
Dominican Republic	Santiago	7.9	10.8		
Dominican Republic	Santiago Rodríguez	8.5	15.6		
Dominican Republic	Santo Domingo	0.4	11.1		
Dominican Republic	Valverde	2.6	10.8		
Ecuador	Azuay	1.9	12.0		
Ecuador	Bolivar	1.2	17.8		
Ecuador	Cañar	1.3	13.0		
Ecuador	Carchi	1.6	21.9		
Ecuador	Chimborazo	0.7	9.2		
Ecuador	Cotopaxi	0.9	19.7		
Ecuador	El Oro	2.1	13.4		
Ecuador	Esmeraldas	0.5	28.5		
Ecuador	Galápagos	N/A	N/A		

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Ecuador	Guayas	0.8	14.1		
Ecuador	Imbabura	1.4	22.4		
Ecuador	Loja	3.7	17.0		
Ecuador	Los Rios	0.7	15.5		
Ecuador	Manabí	0.5	13.4		
Ecuador	Morona Santiago	3.0	30.6		
Ecuador	Napo	3.1	26.5		
Ecuador	Orellana	2.3	30.4		
Ecuador	Pastaza	2.1	26.2		
Ecuador	Pichincha	1.0	18.9		
Ecuador	Santa Elena	1.1	12.2		
Ecuador	Santo Domingo de los Tsachilas	0.5	18.1		
Ecuador	Sucumbios	3.0	33.3		
Ecuador	Tungurahua	1.9	14.2		
Ecuador	Zamora Chinchipe	6.3	37.3		
Equatorial Guinea	Annobón	N/A	N/A		
Equatorial Guinea	Bioko Norte	N/A	N/A		
Equatorial Guinea	Bioko Sur	N/A	N/A		
Equatorial Guinea	Centro Sur	0.2	30.1		
Equatorial Guinea	Kié-Ntem	0.1	26.2		
Equatorial Guinea	Litoral	0.2	29.4		
Equatorial Guinea	Wele-Nzas	0.1	32.5		
Eritrea	Anseba	N/A	N/A		
Eritrea	Debub	N/A	N/A		
Eritrea	Debubawi Keyih Bahri	N/A	N/A		
Eritrea	Gash Barka	N/A	N/A		
Eritrea	Maekel	N/A	N/A		
Eritrea	Semenawi Keyih Bahri	N/A	N/A		
Eswatini	Hhohho	0.1	7.3		
Eswatini	Lubombo	0.3	5.5		
Eswatini	Manzini	0.1	9.0		

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Eswatini	Shiselweni	0.2	8.1		
Ethiopia	Afar	0.1	3.4		
Ethiopia	Amhara	0.0	7.0		
Ethiopia	Benshangul-Gumaz	0.0	7.6		
Ethiopia	Dire Dawa	0.2	3.1		
Ethiopia	Gambela Peoples’	0.1	12.2		
Ethiopia	Harari Peoples’	0.7	5.9		
Ethiopia	Oromia	0.1	8.9		
Ethiopia	Somali	0.3	5.2		
Ethiopia	Southern Nations, Nationalities, and Peoples’	0.0	9.7		
Ethiopia	Tigray	0.2	7.0		
Ethiopia	Addis Ababa	0.0	3.2		
Gabon	Haut-Ogooué	0.5	31.1		
Gabon	Moyen-Ogooué	0.5	32.4		
Gabon	Ngounié	0.4	30.4		
Gabon	Nyanga	0.5	29.5		
Gabon	Ogooué-Ivindo	0.2	33.2		
Gabon	Ogooué-Lolo	0.6	36.8		
Gabon	Ogooué-Maritime	0.5	31.0		
Gabon	Wouleu-Ntem	0.1	34.8		
Georgia	Abkhazia	1.2	13.0		
Georgia	Ajaria	0.3	9.2		
Georgia	Guria	0.4	10.4		
Georgia	Imereti	0.3	9.6		
Georgia	Kakheti	2.3	17.4		
Georgia	Kvemo Kartli	1.8	12.5		
Georgia	Mtskheta-Mtianeti	3.2	20.1		
Georgia	Racha-Lechkhumi-Kvemo Svaneti	1.6	15.6		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Georgia	Samegrelo-Zemo Svaneti	1.2	13.3		
Georgia	Samtskhe-Javakheti	1.2	11.7		
Georgia	Shida Kartli	0.7	17.0		
Georgia	Tbilisi	1.6	12.5		
Ghana	Ahafo	0.0	16.2		
Ghana	Ashanti	0.0	14.7		
Ghana	Bono	0.0	12.9		
Ghana	Bono East	0.0	11.5		
Ghana	Central	0.0	2.6		
Ghana	Eastern	N/A	N/A		
Ghana	Greater Accra	0.1	8.3		
Ghana	North East	0.0	6.8		
Ghana	Northern	N/A	N/A		
Ghana	Oti	0.0	14.2		
Ghana	Savannah	0.0	10.2		
Ghana	Upper East	0.0	7.1		
Ghana	Upper West	0.0	9.7		
Ghana	Volta	0.2	11.1		
Ghana	Western	N/A	N/A		
Ghana	Western North	0.0	21.1		
Gambia	Banjul	0.1	3.1		
Gambia	Lower River	0.0	5.2		
Gambia	Maccarthy Island	0.0	7.1		
Gambia	North Bank	0.0	3.8		
Gambia	Upper River	0.0	7.1		
Gambia	Western	N/A	N/A		
Guatemala	Alta Verapaz	5.3	24.5		
Guatemala	Baja Verapaz	3.1	13.8		
Guatemala	Chimaltenango	3.4	19.4		
Guatemala	Chiquimula	2.0	12.5		
Guatemala	El Progreso	1.6	7.2		
Guatemala	Escuintla	2.7	11.3		
Guatemala	Guatemala	0.7	3.1		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Guatemala	Huehuetenango	5.4	24.1		
Guatemala	Izabal	5.2	27.6		
Guatemala	Jalapa	1.2	6.0		
Guatemala	Jutiapa	1.6	10.4		
Guatemala	Petén	6.8	29.2		
Guatemala	Quezaltenango	2.1	19.0		
Guatemala	Quiché	4.8	19.0		
Guatemala	Retalhuleu	4.5	12.7		
Guatemala	Sacatepéquez	N/A	N/A		
Guatemala	San Marcos	1.9	21.0		
Guatemala	Santa Rosa	N/A	N/A		
Guatemala	Sololá	3.7	22.5		
Guatemala	Suchitepéquez	2.4	11.4		
Guatemala	Totonicapán	2.6	16.5		
Guatemala	Zacapa	2.7	13.9		
Guinea	Boké	0.0	7.9		
Guinea	Conakry	0.2	9.5		
Guinea	Faranah	0.0	9.5		
Guinea	Kankan	0.0	8.7		
Guinea	Kindia	0.0	9.0		
Guinea	Labé	0.0	7.2		
Guinea	Mamou	0.0	8.9		
Guinea	Nzérékoré	0.1	18.5		
Guinea-Bissau	Bafatá	0.0	10.5		
Guinea-Bissau	Biombo	0.0	9.6		
Guinea-Bissau	Bissau	0.0	7.7		
Guinea-Bissau	Bolama	N/A	N/A		
Guinea-Bissau	Cacheu	0.0	8.3		
Guinea-Bissau	Gabú	0.0	8.5		
Guinea-Bissau	Oio	0.0	9.0		
Guinea-Bissau	Quinara	0.0	10.5		
Guinea-Bissau	Tombali	0.0	8.1		
Guyana	Barima-Waini	2.3	39.3		
Guyana	Cuyuni-Mazaruni	3.9	35.3		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Guyana	Demerara-Mahaica	7.1	25.6		
Guyana	East Berbice-Corentyne	8.9	35.3		
Guyana	Essequibo Islands-West Demerara	6.7	41.5		
Guyana	Mahaica-Berbice	12.8	24.4		
Guyana	Pomeroon-Supenaam	2.7	39.9		
Guyana	Potaro-Siparuni	5.2	34.1		
Guyana	Upper Demerara-Berbice	11.4	34.4		
Guyana	Upper Takutu-Upper Essequibo	7.9	33.9		
Haiti	Centre	N/A	N/A		
Haiti	Grand'Anse	N/A	N/A		
Haiti	L'Artibonite	0.4	12.6		
Haiti	Nippes	N/A	N/A		
Haiti	Nord	N/A	N/A		
Haiti	Nord-Est	0.3	11.8		
Haiti	Nord-Ouest	0.1	16.7		
Haiti	Ouest	0.0	18.2		
Haiti	Sud	0.1	32.2		
Haiti	Sud-Est	5.2	8.1		
Honduras	Atlántida	4.7	27.2		
Honduras	Choluteca	1.0	12.7		
Honduras	Colón	4.8	35.0		
Honduras	Comayagua	1.8	11.3		
Honduras	Copán	1.8	11.9		
Honduras	Cortés	4.1	20.3		
Honduras	El Paraíso	0.9	13.5		
Honduras	Francisco Morazán	1.2	8.8		
Honduras	Gracias a Dios	3.4	37.8		
Honduras	Intibucá	2.4	12.4		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Honduras	Islas de la Bahía	N/A	N/A		
Honduras	La Paz	15.0	24.0		
Honduras	Lempira	2.1	13.2		
Honduras	Ocotepeque	1.5	12.4		
Honduras	Olancho	2.5	24.4		
Honduras	Santa Bárbara	3.2	16.9		
Honduras	Valle	1.1	11.8		
Honduras	Yoro	3.3	15.9		
India	Andaman and Nicobar	N/A	N/A		
India	Andhra Pradesh	1.0	21.8		
India	Arunachal Pradesh	0.5	17.6		
India	Assam	0.2	19.9		
India	Bihar	1.0	12.5		
India	Chandigarh	N/A	N/A		
India	Chhattisgarh	0.9	25.7		
India	Dadra and Nagar Haveli	0.1	9.0		
India	Daman and Diu	N/A	N/A		
India	Goa	0.4	31.9		
India	Gujarat	0.3	11.6		
India	Haryana	N/A	N/A		
India	Himachal Pradesh	3.2	15.5		
India	Jammu and Kashmir	3.0	12.0		
India	Jharkhand	1.2	16.0		
India	Karnataka	0.2	26.9		
India	Kerala	0.1	24.8		
India	Lakshadweep	N/A	N/A		
India	Madhya Pradesh	1.4	14.6		
India	Maharashtra	1.1	25.1		
India	Manipur	0.2	25.0		
India	Meghalaya	0.2	30.9		
India	Mizoram	0.0	22.8		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
India	Nagaland	0.3	23.8		
India	National Capital Territory of Delhi	N/A	N/A		
India	Odisha	0.6	22.6		
India	Puducherry	N/A	N/A		
India	Punjab	1.3	10.6		
India	Rajasthan	N/A	N/A		
India	Sikkim	1.7	12.9		
India	Tamil Nadu	0.5	15.9		
India	Telangana	0.9	27.4		
India	Tripura	1.0	37.8		
India	Uttar Pradesh	0.5	8.3		
India	Uttarakhand	2.2	14.7		
India	West Bengal	1.1	17.5		
Indonesia	Aceh	1.2	26.1		
Indonesia	Bali	N/A	N/A		
Indonesia	Bangka Belitung	4.5	28.0		
Indonesia	Banten	1.6	32.2		
Indonesia	Bengkulu	0.7	28.8		
Indonesia	Gorontalo	N/A	N/A		
Indonesia	Jakarta Raya	0.2	18.5		
Indonesia	Jambi	1.0	27.9		
Indonesia	Jawa Barat	0.7	24.4		
Indonesia	Jawa Tengah	0.4	24.1		
Indonesia	Jawa Timur	1.1	24.0		
Indonesia	Kalimantan Barat	2.4	26.1		
Indonesia	Kalimantan Selatan	5.6	27.2		
Indonesia	Kalimantan Tengah	6.1	22.2		
Indonesia	Kalimantan Timur	0.5	26.8		
Indonesia	Kalimantan Utara	0.5	24.1		
Indonesia	Kepulauan Riau	N/A	N/A		
Indonesia	Lampung	0.4	20.4		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Indonesia	Maluku	3.4	23.7		
Indonesia	Maluku Utara	4.2	24.6		
Indonesia	Nusa Tenggara Barat	2.9	29.1		
Indonesia	Nusa Tenggara Timur	1.4	31.7		
Indonesia	Papua	3.2	20.1		
Indonesia	Papua Barat	0.9	20.9		
Indonesia	Riau	1.5	25.0		
Indonesia	Sulawesi Barat	1.4	27.3		
Indonesia	Sulawesi Selatan	1.9	25.7		
Indonesia	Sulawesi Tengah	3.5	24.8		
Indonesia	Sulawesi Tenggara	0.8	21.4		
Indonesia	Sulawesi Utara	N/A	N/A		
Indonesia	Sumatera Barat	0.5	27.1		
Indonesia	Sumatera Selatan	1.9	30.2		
Indonesia	Sumatera Utara	0.6	25.9		
Indonesia	Yogyakarta	0.2	23.3		
Iran (Islamic Republic of)	Alborz	N/A	N/A		
Iran (Islamic Republic of)	Ardebil	2.8	16.7		
Iran (Islamic Republic of)	Bushehr	N/A	N/A		
Iran (Islamic Republic of)	Chahar Mahall and Bakhtiari	N/A	N/A		
Iran (Islamic Republic of)	East Azarbaijan	N/A	N/A		
Iran (Islamic Republic of)	Esfahan	N/A	N/A		
Iran (Islamic Republic of)	Fars	N/A	N/A		
Iran (Islamic Republic of)	Gilan	5.5	18.3		
Iran (Islamic Republic of)	Golestan	4.2	12.0		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Iran (Islamic Republic of)	Hamadan	N/A	N/A		
Iran (Islamic Republic of)	Hormozgan	N/A	N/A		
Iran (Islamic Republic of)	Ilam	N/A	N/A		
Iran (Islamic Republic of)	Kerman	N/A	N/A		
Iran (Islamic Republic of)	Kermanshah	N/A	N/A		
Iran (Islamic Republic of)	Khuzestan	N/A	N/A		
Iran (Islamic Republic of)	Kohgiluyeh and Boyer Ahmad	N/A	N/A		
Iran (Islamic Republic of)	Kordestan	N/A	N/A		
Iran (Islamic Republic of)	Lorestan	N/A	N/A		
Iran (Islamic Republic of)	Markazi	N/A	N/A		
Iran (Islamic Republic of)	Mazandaran	4.6	18.4		
Iran (Islamic Republic of)	North Khorasan	12.7	23.3		
Iran (Islamic Republic of)	Qazvin	4.3	7.0		
Iran (Islamic Republic of)	Qom	N/A	N/A		
Iran (Islamic Republic of)	Razavi Khorasan	N/A	N/A		
Iran (Islamic Republic of)	Semnan	4.9	13.1		
Iran (Islamic Republic of)	Sistan and Baluchestan	N/A	N/A		
Iran (Islamic Republic of)	South Khorasan	N/A	N/A		
Iran (Islamic Republic of)	Tehran	4.5	9.8		
Iran (Islamic Republic of)	West Azarbaijan	N/A	N/A		
Iran (Islamic Republic of)	Yazd	N/A	N/A		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Iran (Islamic Republic of)	Zanjan	N/A	N/A		
Iraq	Al-Anbar	N/A	N/A		
Iraq	Al-Basrah	N/A	N/A		
Iraq	Al-Muthanna	N/A	N/A		
Iraq	Al-Qadisiyah	N/A	N/A		
Iraq	An-Najaf	N/A	N/A		
Iraq	Erbil	N/A	N/A		
Iraq	As-Sulaymaniyah	N/A	N/A		
Iraq	At-Ta’mim	N/A	N/A		
Iraq	Babil	N/A	N/A		
Iraq	Baghdad	N/A	N/A		
Iraq	Dhi-Qar	N/A	N/A		
Iraq	Dihok	N/A	N/A		
Iraq	Diyala	N/A	N/A		
Iraq	Karbala	N/A	N/A		
Iraq	Maysan	N/A	N/A		
Iraq	Ninawa	N/A	N/A		
Iraq	Salah ad-Din	N/A	N/A		
Iraq	Wasit	N/A	N/A		
Jamaica	Clarendon	N/A	N/A		
Jamaica	Hanover	1.2	41.1		
Jamaica	Kingston	N/A	N/A		
Jamaica	Manchester	0.5	15.2		
Jamaica	Portland	N/A	N/A		
Jamaica	Saint Andrew	N/A	N/A		
Jamaica	Saint Ann	N/A	N/A		
Jamaica	Saint Catherine	N/A	N/A		
Jamaica	Saint Elizabeth	0.5	15.0		
Jamaica	Saint James	N/A	N/A		
Jamaica	Saint Mary	N/A	N/A		
Jamaica	Saint Thomas	N/A	N/A		
Jamaica	Trelawny	1.2	38.1		
Jamaica	Westmoreland	1.3	36.6		

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Jordan	Ajlun	N/A	N/A		
Jordan	Amman	N/A	N/A		
Jordan	Aqaba	N/A	N/A		
Jordan	Balqa	N/A	N/A		
Jordan	Irbid	N/A	N/A		
Jordan	Jarash	N/A	N/A		
Jordan	Karak	N/A	N/A		
Jordan	Ma`an	N/A	N/A		
Jordan	Madaba	N/A	N/A		
Jordan	Mafraq	N/A	N/A		
Jordan	Tafilah	N/A	N/A		
Jordan	Zarqa	N/A	N/A		
Kazakhstan	Almaty	8.9	5.9		
Kazakhstan	Aqmola	5.6	10.9		
Kazakhstan	Aqtöbe	6.6	22.4		
Kazakhstan	Atyrau	N/A	N/A		
Kazakhstan	East Kazakhstan	4.5	12.5		
Kazakhstan	Mangghystau	N/A	N/A		
Kazakhstan	North Kazakhstan	1.6	9.6		
Kazakhstan	Pavlodar	10.6	19.6		
Kazakhstan	Qaraghandy	N/A	N/A		
Kazakhstan	Qostanay	2.0	7.5		
Kazakhstan	Qyzylorda	N/A	N/A		
Kazakhstan	South Kazakhstan	N/A	N/A		
Kazakhstan	West Kazakhstan	4.5	19.5		
Kazakhstan	Zhambyl	8.1	4.8		
Kenya	Baringo	0.1	7.6		
Kenya	Bomet	0.0	10.1		
Kenya	Bungoma	0.0	8.8		
Kenya	Busia	0.0	8.4		
Kenya	Elgeyo-Marakwet	0.0	7.4		
Kenya	Embu	0.0	7.6		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Kenya	Garissa	0.0	5.2		
Kenya	Homa Bay	0.0	7.5		
Kenya	Isiolo	N/A	N/A		
Kenya	Kajiado	0.2	4.6		
Kenya	Kakamega	0.0	8.6		
Kenya	Kericho	0.0	10.4		
Kenya	Kiambu	0.1	9.3		
Kenya	Kilifi	0.0	4.5		
Kenya	Kirinyaga	0.0	8.8		
Kenya	Kisii	0.0	9.4		
Kenya	Kisumu	0.0	8.2		
Kenya	Kitui	0.1	5.3		
Kenya	Kwale	0.1	7.7		
Kenya	Laikipia	0.1	6.2		
Kenya	Lamu	0.0	8.2		
Kenya	Machakos	0.0	6.2		
Kenya	Makueni	0.2	4.6		
Kenya	Mandera	N/A	N/A		
Kenya	Marsabit	0.7	2.7		
Kenya	Meru	0.4	7.2		
Kenya	Migori	0.0	8.6		
Kenya	Mombasa	N/A	N/A		
Kenya	Murang'a	0.0	8.3		
Kenya	Nairobi	0.0	5.5		
Kenya	Nakuru	0.1	7.9		
Kenya	Nandi	0.0	9.0		
Kenya	Narok	0.0	8.0		
Kenya	Nyamira	0.0	7.4		
Kenya	Nyandarua	0.1	8.2		
Kenya	Nyeri	0.0	8.0		
Kenya	Samburu	1.2	5.0		
Kenya	Siaya	0.0	7.8		
Kenya	Taita Taveta	0.2	5.9		
Kenya	Tana River	0.0	4.2		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Kenya	Tharaka-Nithi	0.1	6.8		
Kenya	Trans Nzoia	0.0	8.6		
Kenya	Turkana	0.2	4.1		
Kenya	Uasin Gishu	0.0	8.3		
Kenya	Vihiga	0.0	8.6		
Kenya	Wajir	N/A	N/A		
Kenya	West Pokot	0.1	8.1		
Kyrgyzstan	Batken	N/A	N/A		
Kyrgyzstan	Biškek	13.3	23.8		
Kyrgyzstan	Chüy	6.2	7.6		
Kyrgyzstan	Jalal-Abad	3.1	7.2		
Kyrgyzstan	Naryn	2.9	4.1		
Kyrgyzstan	Osh	2.1	7.9		
Kyrgyzstan	Osh (city)	N/A	N/A		
Kyrgyzstan	Talas	6.4	3.6		
Kyrgyzstan	Ysyk-Köl	2.1	4.4		
Lao People's Democratic Republic	Attapu	0.1	21.2		
Lao People's Democratic Republic	Bokeo	0.1	19.3		
Lao People's Democratic Republic	Bolikhamxai	0.1	19.1		
Lao People's Democratic Republic	Champasak	0.1	23.7		
Lao People's Democratic Republic	Houaphan	0.1	23.0		
Lao People's Democratic Republic	Khammouan	0.1	18.4		
Lao People's Democratic Republic	Louang Namtha	0.0	18.5		
Lao People's Democratic Republic	Louangphrabang	0.0	25.1		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Lao People's Democratic Republic	Oudômxai	0.0	21.3		
Lao People's Democratic Republic	Phôngsali	0.1	20.1		
Lao People's Democratic Republic	Saravan	0.1	23.4		
Lao People's Democratic Republic	Savannakhét	0.0	27.3		
Lao People's Democratic Republic	Vientiane	0.0	23.6		
Lao People's Democratic Republic	Vientiane [prefecture]	0.0	32.4		
Lao People's Democratic Republic	Xaignabouri	0.1	24.2		
Lao People's Democratic Republic	Xaisômboun	0.0	19.1		
Lao People's Democratic Republic	Xékong	0.0	18.9		
Lao People's Democratic Republic	Xiangkhoang	0.0	23.4		
Liberia	Bomi	0.1	20.9		
Liberia	Bong	0.2	22.5		
Liberia	Gbarpolu	0.4	33.1		
Liberia	Grand Bassa	0.1	21.2		
Liberia	Grand Cape Mount	0.2	29.3		
Liberia	Grand Gedeh	0.3	33.3		
Liberia	Grand Kru	0.1	27.5		
Liberia	Lofa	0.4	33.2		
Liberia	Margibi	0.1	19.6		
Liberia	Maryland	0.1	21.4		
Liberia	Montserrado	0.1	20.3		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Liberia	Nimba	0.3	28.0		
Liberia	River Gee	0.2	29.5		
Liberia	Rivercess	0.2	29.0		
Liberia	Sinoe	0.3	33.8		
Madagascar	Antananarivo	0.2	6.8		
Madagascar	Antsiranana	0.5	14.9		
Madagascar	Fianarantsoa	0.6	13.1		
Madagascar	Mahajanga	0.6	7.3		
Madagascar	Toamasina	0.3	16.8		
Madagascar	Toliary	1.1	5.8		
Malawi	Balaka	0.1	8.7		
Malawi	Blantyre	0.0	7.7		
Malawi	Chikwawa	0.1	6.1		
Malawi	Chiradzulu	0.0	5.6		
Malawi	Chitipa	0.0	9.3		
Malawi	Dedza	0.0	8.5		
Malawi	Dowa	0.0	5.9		
Malawi	Karonga	0.0	8.9		
Malawi	Kasungu	0.0	5.6		
Malawi	Likoma	N/A	N/A		
Malawi	Lilongwe	0.0	7.0		
Malawi	Machinga	0.0	8.7		
Malawi	Mangochi	0.0	9.3		
Malawi	Mchinji	0.0	7.0		
Malawi	Mulanje	0.1	8.3		
Malawi	Mwanza	0.0	8.9		
Malawi	Mzimba	0.0	9.2		
Malawi	Neno	0.0	8.1		
Malawi	Nkhata Bay	0.0	8.3		
Malawi	Nkhotakota	0.0	8.8		
Malawi	Nsanje	0.2	6.8		
Malawi	Ntcheu	0.0	8.2		
Malawi	Ntchisi	0.0	8.0		
Malawi	Phalombe	0.0	6.6		

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Malawi	Rumphi	0.0	9.3		
Malawi	Salima	0.0	8.8		
Malawi	Thyolo	0.2	7.5		
Malawi	Zomba	0.0	6.0		
Malaysia	Johor	2.0	22.7		
Malaysia	Kedah	0.0	30.9		
Malaysia	Kelantan	0.0	27.3		
Malaysia	Kuala Lumpur	0.4	30.7		
Malaysia	Labuan	N/A	N/A		
Malaysia	Melaka	8.8	30.3		
Malaysia	Negeri Sembilan	1.6	27.0		
Malaysia	Pahang	0.2	26.8		
Malaysia	Perak	0.2	29.1		
Malaysia	Perlis	0.1	29.6		
Malaysia	Pulau Pinang	N/A	N/A		
Malaysia	Putrajaya	0.5	19.8		
Malaysia	Sabah	0.5	24.3		
Malaysia	Sarawak	0.6	25.1		
Malaysia	Selangor	0.7	25.0		
Malaysia	Trengganu	0.1	28.2		
Mali	Bamako	0.0	5.3		
Mali	Gao	N/A	N/A		
Mali	Kayes	0.0	3.5		
Mali	Kidal	N/A	N/A		
Mali	Koulikoro	0.0	6.1		
Mali	Mopti	N/A	N/A		
Mali	Ségou	0.0	8.7		
Mali	Sikasso	0.0	8.9		
Mali	Timbuktu	N/A	N/A		
Mauritania	Adrar	N/A	N/A		
Mauritania	Assaba	N/A	N/A		
Mauritania	Brakna	N/A	N/A		
Mauritania	Dakhlet Nouadhibou	N/A	N/A		

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Mauritania	Gorgol	N/A	N/A		
Mauritania	Guidimaka	N/A	N/A		
Mauritania	Hodh ech Chargui	N/A	N/A		
Mauritania	Hodh el Gharbi	N/A	N/A		
Mauritania	Inchiri	N/A	N/A		
Mauritania	Nouakchott	N/A	N/A		
Mauritania	Tagant	N/A	N/A		
Mauritania	Tiris Zemmour	N/A	N/A		
Mauritania	Trarza	N/A	N/A		
Mexico	Aguascalientes	0.8	7.8		
Mexico	Baja California	53.5	1.3		
Mexico	Baja California Sur	N/A	N/A		
Mexico	Campeche	10.7	31.5		
Mexico	Chiapas	4.2	22.8		
Mexico	Chihuahua	1.4	1.0		
Mexico	Coahuila	4.2	5.7		
Mexico	Colima	2.2	16.7		
Mexico	Distrito Federal	0.4	9.5		
Mexico	Durango	1.2	2.9		
Mexico	Guanajuato	2.4	8.4		
Mexico	Guerrero	1.2	11.6		
Mexico	Hidalgo	4.1	8.1		
Mexico	Jalisco	1.7	8.9		
Mexico	México	2.7	8.2		
Mexico	Michoacán	2.2	10.5		
Mexico	Morelos	3.9	10.1		
Mexico	Nayarit	1.5	7.8		
Mexico	Nuevo León	3.9	7.9		
Mexico	Oaxaca	4.1	14.8		
Mexico	Puebla	4.2	9.4		
Mexico	Querétaro	2.2	5.1		
Mexico	Quintana Roo	11.0	36.4		
Mexico	San Luis Potosí	4.2	10.6		

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Mexico	Sinaloa	0.7	12.0		
Mexico	Sonora	1.7	3.0		
Mexico	Tabasco	2.2	12.3		
Mexico	Tamaulipas	4.7	12.1		
Mexico	Tlaxcala	3.4	4.1		
Mexico	Veracruz	1.9	11.0		
Mexico	Yucatán	3.3	26.6		
Mexico	Zacatecas	1.0	3.3		
Mongolia	Arhangay	8.8	3.8		
Mongolia	Bayan-Ölgiy	N/A	N/A		
Mongolia	Bayanhongor	N/A	N/A		
Mongolia	Bulgan	15.8	6.1		
Mongolia	Darhan-Uul	19.0	16.1		
Mongolia	Dornod	13.1	3.3		
Mongolia	Dornogovi	N/A	N/A		
Mongolia	Dundgovi	N/A	N/A		
Mongolia	Dzavhan	23.5	2.9		
Mongolia	Govi-Altay	N/A	N/A		
Mongolia	Govisümber	N/A	N/A		
Mongolia	Hentiy	18.3	3.4		
Mongolia	Hovd	N/A	N/A		
Mongolia	Hövsgöl	15.3	2.7		
Mongolia	Ömnögovi	N/A	N/A		
Mongolia	Orhon	N/A	N/A		
Mongolia	Övörhangay	N/A	N/A		
Mongolia	Selenge	15.4	4.9		
Mongolia	Sühbaatar	N/A	N/A		
Mongolia	Töv	13.5	2.7		
Mongolia	Ulaanbaatar	N/A	N/A		
Mongolia	Uvs	N/A	N/A		
Mozambique	Cabo Delgado	0.1	10.9		
Mozambique	Gaza	0.2	3.5		
Mozambique	Inhambane	0.5	6.0		
Mozambique	Manica	0.1	6.9		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Mozambique	Maputo	0.3	4.8		
Mozambique	Maputo City	N/A	N/A		
Mozambique	Nampula	0.0	9.1		
Mozambique	Nassa	0.1	9.1		
Mozambique	Sofala	0.2	8.7		
Mozambique	Tete	0.0	7.3		
Mozambique	Zambezia	0.1	8.5		
Myanmar	Ayeyarwady	0.1	14.7		
Myanmar	Bago	0.2	23.4		
Myanmar	Chin	0.1	33.8		
Myanmar	Kachin	0.3	15.4		
Myanmar	Kayah	0.2	36.1		
Myanmar	Kayin	0.1	23.2		
Myanmar	Magway	0.2	25.4		
Myanmar	Mandalay	0.6	30.8		
Myanmar	Mon	0.2	38.4		
Myanmar	Naypyitaw	0.1	11.1		
Myanmar	Rakhine	0.2	23.1		
Myanmar	Sagaing	0.2	22.3		
Myanmar	Shan	0.4	35.8		
Myanmar	Tanintharyi	0.2	19.8		
Myanmar	Yangon	0.3	38.6		
Namibia	||Kharas	N/A	N/A		
Namibia	Erongo	N/A	N/A		
Namibia	Hardap	N/A	N/A		
Namibia	Kavango	0.0	5.5		
Namibia	Khomas	N/A	N/A		
Namibia	Kunene	0.7	4.6		
Namibia	Ohangwena	0.0	6.8		
Namibia	Omaheke	N/A	N/A		
Namibia	Omusati	N/A	N/A		
Namibia	Oshana	N/A	N/A		
Namibia	Oshikoto	0.1	4.9		
Namibia	Otjozondjupa	0.4	5.2		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Namibia	Zambezi	0.0	3.3		
Nepal	Central	0.0	2.6		
Nepal	East	2.6	22.0		
Nepal	Far-Western	3.1	21.3		
Nepal	Mid-Western	2.0	19.8		
Nepal	West	1.7	22.5		
Nicaragua	Atlántico Norte	2.6	29.9		
Nicaragua	Atlántico Sur	2.2	23.0		
Nicaragua	Boaco	0.2	13.3		
Nicaragua	Carazo	0.7	11.8		
Nicaragua	Chinandega	0.7	13.1		
Nicaragua	Chontales	0.2	12.4		
Nicaragua	Estelí	0.7	11.5		
Nicaragua	Granada	1.5	22.3		
Nicaragua	Jinotega	1.2	28.8		
Nicaragua	Lago Nicaragua	0.5	12.2		
Nicaragua	León	0.6	12.2		
Nicaragua	Madriz	1.0	13.1		
Nicaragua	Managua	0.4	12.5		
Nicaragua	Masaya	0.5	12.1		
Nicaragua	Matagalpa	0.3	12.9		
Nicaragua	Nueva Segovia	0.9	11.6		
Nicaragua	Río San Juan	1.0	19.5		
Nicaragua	Rivas	1.3	17.7		
Niger	Agadez	N/A	N/A		
Niger	Diffa	N/A	N/A		
Niger	Dosso	0.0	8.4		
Niger	Maradi	N/A	N/A		
Niger	Niamey	N/A	N/A		
Niger	Tahoua	N/A	N/A		
Niger	Tillabéry	0.0	2.8		
Niger	Zinder	N/A	N/A		
Nigeria	Abia	0.0	11.2		
Nigeria	Adamawa	0.0	10.0		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Nigeria	Akwa Ibom	0.0	11.6		
Nigeria	Anambra	0.0	11.8		
Nigeria	Bauchi	0.0	6.7		
Nigeria	Bayelsa	0.2	39.2		
Nigeria	Benue	0.0	11.0		
Nigeria	Borno	0.0	3.7		
Nigeria	Cross River	0.1	23.3		
Nigeria	Delta	0.2	19.1		
Nigeria	Ebonyi	0.0	12.0		
Nigeria	Edo	0.1	17.3		
Nigeria	Ekiti	0.0	19.4		
Nigeria	Enugu	0.0	12.3		
Nigeria	Federal Capital Territory	0.0	10.6		
Nigeria	Gombe	0.0	4.8		
Nigeria	Imo	0.0	11.5		
Nigeria	Jigawa	0.0	1.8		
Nigeria	Kaduna	0.0	10.0		
Nigeria	Kano	0.0	8.7		
Nigeria	Katsina	0.0	8.6		
Nigeria	Kebbi	0.0	10.3		
Nigeria	Kogi	0.0	11.9		
Nigeria	Kwara	0.0	10.8		
Nigeria	Lagos	N/A	N/A		
Nigeria	Nasarawa	0.0	10.4		
Nigeria	Niger	0.0	10.6		
Nigeria	Ogun	0.0	12.7		
Nigeria	Ondo	0.0	19.0		
Nigeria	Osun	0.0	17.7		
Nigeria	Oyo	0.0	11.0		
Nigeria	Plateau	0.0	11.0		
Nigeria	Rivers	0.1	16.9		
Nigeria	Sokoto	0.0	10.4		
Nigeria	Taraba	0.0	13.1		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Nigeria	Yobe	0.0	1.4		
Nigeria	Zamfara	0.0	9.4		
Pakistan	Azad Kashmir	2.6	8.0		
Pakistan	Balochistan	N/A	N/A		
Pakistan	Federally Administered Tribal Area	9.9	3.9		
Pakistan	Gilgit-Baltistan	2.4	3.6		
Pakistan	Islamabad	N/A	N/A		
Pakistan	Khyber-Pakhtunkhwa	2.5	5.9		
Pakistan	Punjab	1.3	10.6		
Pakistan	Sindh	N/A	N/A		
Panama	Bocas del Toro	N/A	N/A		
Panama	Chiriquí	0.9	11.5		
Panama	Coclé	0.9	16.8		
Panama	Colón	4.8	35.0		
Panama	Darién	10.0	30.2		
Panama	Emberá	11.3	34.9		
Panama	Herrera	0.8	13.1		
Panama	Kuna Yala	2.8	48.3		
Panama	Los Santos	0.5	13.6		
Panama	Ngöbe Buglé	3.9	29.1		
Panama	Panamá	1.2	43.7		
Panama	Panamá Oeste	1.3	24.7		
Panama	Veraguas	1.0	16.3		
Papua New Guinea	Bougainville	N/A	N/A		
Papua New Guinea	Central	0.0	2.6		
Papua New Guinea	Chimbu	0.9	21.0		
Papua New Guinea	East New Britain	N/A	N/A		
Papua New Guinea	East Sepik	1.2	26.9		
Papua New Guinea	Eastern Highlands	1.1	21.5		
Papua New Guinea	Enga	1.6	14.0		
Papua New Guinea	Gulf	3.6	15.8		
Papua New Guinea	Hela	0.7	16.3		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Papua New Guinea	Jiwaka	0.8	21.4		
Papua New Guinea	Madang	1.0	20.7		
Papua New Guinea	Manus	N/A	N/A		
Papua New Guinea	Milne Bay	0.7	17.2		
Papua New Guinea	Morobe	0.7	20.1		
Papua New Guinea	National Capital District	N/A	N/A		
Papua New Guinea	New Ireland	N/A	N/A		
Papua New Guinea	Oro	0.6	14.5		
Papua New Guinea	Sandaun	0.4	20.1		
Papua New Guinea	Southern Highlands	0.6	17.1		
Papua New Guinea	West New Britain	N/A	N/A		
Papua New Guinea	Western	N/A	N/A		
Papua New Guinea	Western Highlands	1.0	21.4		
Peru	Amazonas	9.6	32.1		
Peru	Ancash	0.9	4.9		
Peru	Apurímac	2.2	5.4		
Peru	Arequipa	N/A	N/A		
Peru	Ayacucho	2.8	21.5		
Peru	Cajamarca	4.0	12.6		
Peru	Callao	N/A	N/A		
Peru	Cusco	4.3	27.8		
Peru	Huancavelica	3.2	9.6		
Peru	Huánuco	3.5	35.8		
Peru	Ica	N/A	N/A		
Peru	Junín	3.9	35.4		
Peru	La Libertad	1.9	15.5		
Peru	Lambayeque	4.1	3.3		
Peru	Lima	N/A	N/A		
Peru	Lima Province	N/A	N/A		
Peru	Loreto	2.6	33.1		
Peru	Madre de Dios	3.6	33.4		
Peru	Moquegua	N/A	N/A		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Peru	Pasco	2.4	36.8		
Peru	Piura	3.3	12.4		
Peru	Puno	9.3	21.1		
Peru	San Martín	3.0	37.7		
Peru	Tacna	N/A	N/A		
Peru	Tumbes	2.5	21.1		
Peru	Ucayali	1.9	38.1		
Philippines	Abra	0.1	17.5		
Philippines	Agusan del Norte	0.9	29.0		
Philippines	Agusan del Sur	0.4	24.5		
Philippines	Aklan	0.5	31.0		
Philippines	Albay	0.7	27.2		
Philippines	Antique	N/A	N/A		
Philippines	Apayao	0.1	21.1		
Philippines	Aurora	0.3	20.9		
Philippines	Basilan	N/A	N/A		
Philippines	Bataan	N/A	N/A		
Philippines	Batanes	N/A	N/A		
Philippines	Batangas	N/A	N/A		
Philippines	Benguet	0.1	28.3		
Philippines	Biliran	0.7	21.5		
Philippines	Bohol	0.4	41.8		
Philippines	Bukidnon	0.6	21.4		
Philippines	Bulacan	0.2	23.4		
Philippines	Cagayan	0.3	24.3		
Philippines	Camarines Norte	0.7	26.4		
Philippines	Camarines Sur	0.4	18.2		
Philippines	Camiguin	N/A	N/A		
Philippines	Capiz	0.4	29.8		
Philippines	Catanduanes	N/A	N/A		
Philippines	Cavite	N/A	N/A		
Philippines	Cebu	0.2	38.7		
Philippines	Compostela Valley	0.4	26.6		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Philippines	Davao del Norte	0.3	27.8		
Philippines	Davao del Sur	0.3	28.5		
Philippines	Davao Oriental	0.8	39.0		
Philippines	Dinagat Islands	N/A	N/A		
Philippines	Eastern Samar	N/A	N/A		
Philippines	Guimaras	N/A	N/A		
Philippines	Ifugao	0.2	30.3		
Philippines	Ilocos Norte	N/A	N/A		
Philippines	Ilocos Sur	0.1	30.7		
Philippines	Iloilo	0.3	35.8		
Philippines	Isabela	0.2	25.5		
Philippines	Kalinga	0.2	27.3		
Philippines	La Union	0.1	39.7		
Philippines	Laguna	N/A	N/A		
Philippines	Lanao del Norte	0.7	26.8		
Philippines	Lanao del Sur	0.7	21.2		
Philippines	Leyte	0.2	26.9		
Philippines	Maguindanao	0.3	22.0		
Philippines	Marinduque	N/A	N/A		
Philippines	Masbate	N/A	N/A		
Philippines	Metropolitan Manila	N/A	N/A		
Philippines	Misamis Occidental	0.6	30.0		
Philippines	Misamis Oriental	0.4	23.3		
Philippines	Mountain Province	0.1	22.8		
Philippines	Negros Occidental	0.3	32.6		
Philippines	Negros Oriental	0.4	39.6		
Philippines	North Cotabato	0.4	23.1		
Philippines	Northern Samar	0.5	27.4		
Philippines	Nueva Ecija	0.1	19.0		
Philippines	Nueva Vizcaya	0.2	31.4		
Philippines	Occidental Mindoro	N/A	N/A		

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Philippines	Oriental Mindoro	N/A	N/A		
Philippines	Palawan	N/A	N/A		
Philippines	Pampanga	0.1	19.8		
Philippines	Pangasinan	0.1	26.7		
Philippines	Quezon	0.5	35.7		
Philippines	Quirino	0.2	23.8		
Philippines	Rizal	N/A	N/A		
Philippines	Romblon	N/A	N/A		
Philippines	Samar	0.6	32.2		
Philippines	Sarangani	0.3	23.6		
Philippines	Siquijor	N/A	N/A		
Philippines	Sorsogon	0.6	34.0		
Philippines	South Cotabato	0.2	31.1		
Philippines	Southern Leyte	N/A	N/A		
Philippines	Sultan Kudarat	0.1	21.3		
Philippines	Sulu	N/A	N/A		
Philippines	Surigao del Norte	2.8	35.0		
Philippines	Surigao del Sur	0.9	26.3		
Philippines	Tarlac	0.1	13.8		
Philippines	Tawi-Tawi	N/A	N/A		
Philippines	Zambales	N/A	N/A		
Philippines	Zamboanga del Norte	0.4	29.1		
Philippines	Zamboanga del Sur	0.3	22.9		
Philippines	Zamboanga Sibugay	0.4	35.3		
Rwanda	Amajyaruguru	0.1	9.9		
Rwanda	Amajyepfo	0.0	11.1		
Rwanda	Iburasirazuba	0.0	9.0		
Rwanda	Iburengerazuba	0.1	17.2		
Rwanda	Umujyi wa Kigali	0.0	7.8		
Senegal	Dakar	N/A	N/A		
Senegal	Diourbel	N/A	N/A		
Senegal	Fatick	0.1	2.0		

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Senegal	Kaffrine	0.0	4.6		
Senegal	Kaolack	0.0	1.7		
Senegal	Kédougou	0.0	4.8		
Senegal	Kolda	0.0	7.5		
Senegal	Louga	N/A	N/A		
Senegal	Matam	N/A	N/A		
Senegal	Saint-Louis	N/A	N/A		
Senegal	Sédhiou	0.0	7.4		
Senegal	Tambacounda	0.0	3.5		
Senegal	Thiès	N/A	N/A		
Senegal	Ziguinchor	0.0	5.4		
Sierra Leone	Eastern	N/A	N/A		
Sierra Leone	Northern	N/A	N/A		
Sierra Leone	Southern	N/A	N/A		
Sierra Leone	Western	N/A	N/A		
Somalia	Awdal	N/A	N/A		
Somalia	Bakool	N/A	N/A		
Somalia	Bari	N/A	N/A		
Somalia	Bay	0.0	2.5		
Somalia	Galguduud	N/A	N/A		
Somalia	Gedo	N/A	N/A		
Somalia	Hiiraan	N/A	N/A		
Somalia	Jubbada Dhexe	0.0	3.8		
Somalia	Jubbada Hoose	0.0	4.3		
Somalia	Mudug	N/A	N/A		
Somalia	Nugaal	N/A	N/A		
Somalia	Sanaag	N/A	N/A		
Somalia	Shabeellaha Dhexe	N/A	N/A		
Somalia	Shabeellaha Hoose	0.0	4.2		
Somalia	Sool	N/A	N/A		
Somalia	Togdheer	N/A	N/A		
Somalia	Banaadir	N/A	N/A		
South Africa	Eastern Cape	1.2	5.9		

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South Africa	Free State	0.0	4.3		
South Africa	Gauteng	0.1	2.6		
South Africa	KwaZulu-Natal	0.2	6.2		
South Africa	Limpopo	0.1	3.2		
South Africa	Mpumalanga	0.1	4.8		
South Africa	North West	0.1	3.4		
South Africa	Northern Cape	N/A	N/A		
South Africa	Western Cape	9.8	4.9		
South Sudan	Central Equatoria	0.0	7.5		
South Sudan	Eastern Equatoria	0.0	6.8		
South Sudan	Jungoli	0.1	3.3		
South Sudan	Lakes	0.0	6.6		
South Sudan	North Bahr-al-Ghazal	0.0	4.6		
South Sudan	Unity	0.1	3.1		
South Sudan	Upper Nile	0.1	3.0		
South Sudan	Warap	0.0	7.4		
South Sudan	West Bahr-al-Ghazal	0.0	7.5		
South Sudan	West Equatoria	0.0	10.5		
Sri Lanka	Ampara	0.3	24.8		
Sri Lanka	Anuradhapura	0.4	34.8		
Sri Lanka	Badulla	0.3	34.3		
Sri Lanka	Batticaloa	0.2	14.4		
Sri Lanka	Colombo	N/A	N/A		
Sri Lanka	Galle	N/A	N/A		
Sri Lanka	Gampaha	0.2	39.1		
Sri Lanka	Hambantota	N/A	N/A		
Sri Lanka	Jaffna	N/A	N/A		
Sri Lanka	Kalutara	N/A	N/A		
Sri Lanka	Kandy	0.2	29.9		
Sri Lanka	Kegalle	0.2	34.8		
Sri Lanka	Kilinochchi	0.1	9.2		
Sri Lanka	Kurunegala	0.1	28.3		

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Sri Lanka	Mannar	0.6	28.2		
Sri Lanka	Matale	0.2	23.7		
Sri Lanka	Matara	N/A	N/A		
Sri Lanka	Moneragala	0.4	34.9		
Sri Lanka	Mullaitivu	0.4	29.6		
Sri Lanka	Nuwara Eliya	0.2	26.6		
Sri Lanka	Polonnaruwa	0.3	27.3		
Sri Lanka	Puttalam	0.1	31.4		
Sri Lanka	Ratnapura	0.2	34.3		
Sri Lanka	Trincomalee	0.7	31.5		
Sri Lanka	Vavuniya	0.5	32.0		
Sudan	Al Jazirah	N/A	N/A		
Sudan	Al Qadarif	0.0	2.1		
Sudan	Blue Nile	0.0	4.0		
Sudan	Central Darfur	0.0	8.2		
Sudan	East Darfur	0.0	6.6		
Sudan	Kassala	N/A	N/A		
Sudan	Khartoum	N/A	N/A		
Sudan	North Darfur	N/A	N/A		
Sudan	North Kurdufan	N/A	N/A		
Sudan	Northern	N/A	N/A		
Sudan	Red Sea	N/A	N/A		
Sudan	River Nile	N/A	N/A		
Sudan	Sennar	0.0	4.6		
Sudan	South Darfur	0.0	5.4		
Sudan	South Kurdufan	0.1	5.3		
Sudan	West Darfur	N/A	N/A		
Sudan	West Kurdufan	0.0	6.4		
Sudan	White Nile	N/A	N/A		
Syrian Arab Republic	Al Ḩasakah	N/A	N/A		
Syrian Arab Republic	Aleppo	14.1	35.7		
Syrian Arab Republic	Ar Raqqah	N/A	N/A		

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Syrian Arab Republic	As Suwayda	N/A	N/A		
Syrian Arab Republic	Damascus	N/A	N/A		
Syrian Arab Republic	Dar`a	N/A	N/A		
Syrian Arab Republic	Dayr Az Zawr	N/A	N/A		
Syrian Arab Republic	Hamah	19.8	23.5		
Syrian Arab Republic	Hims	N/A	N/A		
Syrian Arab Republic	Idlib	16.3	25.1		
Syrian Arab Republic	Lattakia	16.0	18.0		
Syrian Arab Republic	Quneitra	N/A	N/A		
Syrian Arab Republic	Rif Dimashq	N/A	N/A		
Syrian Arab Republic	Tartus	N/A	N/A		
Tajikistan	Districts of Republican Subordination	N/A	N/A		
Tajikistan	Dushanbe	N/A	N/A		
Tajikistan	Gorno-Badakhshan	N/A	N/A		
Tajikistan	Khatlon	N/A	N/A		
Tajikistan	Sughd	12.1	8.8		
Thailand	Amnat Charoen	0.1	17.2		
Thailand	Ang Thong	N/A	N/A		
Thailand	Bangkok Metropolis	0.5	20.7		
Thailand	Bueng Kan	0.1	16.9		
Thailand	Buri Ram	0.1	17.5		
Thailand	Chachoengsao	0.0	15.5		
Thailand	Chai Nat	0.1	15.7		
Thailand	Chaiyaphum	0.1	17.9		
Thailand	Chanthaburi	0.0	26.6		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Thailand	Chiang Mai	0.3	29.7		
Thailand	Chiang Rai	0.2	25.0		
Thailand	Chon Buri	0.0	21.0		
Thailand	Chumphon	0.2	38.1		
Thailand	Kalasin	0.1	15.2		
Thailand	Kamphaeng Phet	0.1	17.6		
Thailand	Kanchanaburi	0.1	23.3		
Thailand	Khon Kaen	0.2	18.4		
Thailand	Krabi	0.1	39.2		
Thailand	Lampang	0.3	36.7		
Thailand	Lamphun	0.4	41.3		
Thailand	Loei	0.2	35.3		
Thailand	Lop Buri	0.1	13.4		
Thailand	Mae Hong Son	0.2	29.3		
Thailand	Maha Sarakham	N/A	N/A		
Thailand	Mukdahan	0.1	19.2		
Thailand	Nakhon Nayok	0.2	20.8		
Thailand	Nakhon Pathom	0.5	40.9		
Thailand	Nakhon Phanom	0.1	17.3		
Thailand	Nakhon Ratchasima	0.1	16.3		
Thailand	Nakhon Sawan	0.1	16.1		
Thailand	Nakhon Si Thammarat	0.0	31.2		
Thailand	Nan	0.1	29.5		
Thailand	Narathiwat	0.1	33.5		
Thailand	Nong Bua Lam Phu	0.2	18.4		
Thailand	Nong Khai	0.1	23.0		
Thailand	Nonthaburi	N/A	N/A		
Thailand	Pathum Thani	0.8	30.3		
Thailand	Pattani	0.4	35.7		
Thailand	Phangnga	0.7	36.0		
Thailand	Phatthalung	0.0	25.4		
Thailand	Phayao	0.1	20.6		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Thailand	Phetchabun	0.2	26.6		
Thailand	Phetchaburi	0.0	17.6		
Thailand	Phichit	0.1	15.9		
Thailand	Phitsanulok	0.1	28.6		
Thailand	Phra Nakhon Si Ayutthaya	1.2	43.3		
Thailand	Phrae	0.2	40.0		
Thailand	Phuket	N/A	N/A		
Thailand	Prachin Buri	0.0	21.4		
Thailand	Prachuap Khiri Khan	0.0	15.6		
Thailand	Ranong	0.3	30.9		
Thailand	Ratchaburi	0.1	25.7		
Thailand	Rayong	0.0	37.0		
Thailand	Roi Et	N/A	N/A		
Thailand	Sa Kaeo	0.0	16.2		
Thailand	Sakon Nakhon	0.2	17.9		
Thailand	Samut Prakan	N/A	N/A		
Thailand	Samut Sakhon	N/A	N/A		
Thailand	Samut Songkhram	0.2	35.0		
Thailand	Saraburi	0.2	22.1		
Thailand	Satun	0.2	29.4		
Thailand	Si Sa Ket	0.1	18.3		
Thailand	Sing Buri	N/A	N/A		
Thailand	Songkhla	0.1	38.8		
Thailand	Sukhothai	0.2	27.1		
Thailand	Suphan Buri	0.1	24.5		
Thailand	Surat Thani	0.2	37.6		
Thailand	Surin	0.1	15.6		
Thailand	Tak	0.2	26.9		
Thailand	Trang	0.0	36.7		
Thailand	Trat	0.2	24.7		
Thailand	Ubon Ratchathani	0.0	17.6		
Thailand	Udon Thani	0.1	22.6		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Thailand	Uthai Thani	0.1	20.1		
Thailand	Uttaradit	0.2	36.7		
Thailand	Yala	0.1	32.6		
Thailand	Yasothon	0.1	14.6		
Timor-Leste	Aileu	2.2	33.9		
Timor-Leste	Ainaro	1.8	30.9		
Timor-Leste	Ambeno	2.3	33.8		
Timor-Leste	Baucau	N/A	N/A		
Timor-Leste	Bobonaro	1.6	38.4		
Timor-Leste	Covalima	1.0	35.6		
Timor-Leste	Dili	N/A	N/A		
Timor-Leste	Ermera	1.9	34.8		
Timor-Leste	Lautém	N/A	N/A		
Timor-Leste	Liquiçá	N/A	N/A		
Timor-Leste	Manatuto	2.6	33.9		
Timor-Leste	Manufahi	2.4	33.1		
Timor-Leste	Viqueque	N/A	N/A		
Togo	Centre	N/A	N/A		
Togo	Kara	0.0	9.5		
Togo	Maritime	0.8	10.2		
Togo	Plateaux	0.9	17.3		
Togo	Savanes	0.0	9.9		
Türkiye	Adana	2.4	21.3		
Türkiye	Adıyaman	N/A	N/A		
Türkiye	Afyon	3.9	35.5		
Türkiye	Ağrı	N/A	N/A		
Türkiye	Aksaray	N/A	N/A		
Türkiye	Amasya	1.2	39.8		
Türkiye	Ankara	2.2	40.7		
Türkiye	Antalya	4.5	21.4		
Türkiye	Ardahan	N/A	N/A		
Türkiye	Artvin	0.8	18.5		
Türkiye	Aydın	12.8	21.2		
Türkiye	Balıkesir	1.9	33.0		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Türkiye	Bartın	0.4	15.6		
Türkiye	Batman	N/A	N/A		
Türkiye	Bayburt	2.2	18.4		
Türkiye	Bilecik	3.6	29.3		
Türkiye	Bingöl	N/A	N/A		
Türkiye	Bitlis	N/A	N/A		
Türkiye	Bolu	0.6	22.3		
Türkiye	Burdur	7.2	33.9		
Türkiye	Bursa	2.7	27.3		
Türkiye	Çanakkale	1.8	26.1		
Türkiye	Çankırı	1.2	39.1		
Türkiye	Çorum	1.1	29.4		
Türkiye	Denizli	9.3	31.1		
Türkiye	Diyarbakır	N/A	N/A		
Türkiye	Düzce	0.4	18.0		
Türkiye	Edirne	7.8	13.9		
Türkiye	Elazığ	2.8	13.1		
Türkiye	Erzincan	6.5	25.0		
Türkiye	Erzurum	2.3	18.2		
Türkiye	Eskişehir	5.9	30.4		
Türkiye	Gaziantep	10.5	30.3		
Türkiye	Giresun	1.9	21.9		
Türkiye	Gümüşhane	2.2	22.2		
Türkiye	Hakkari	N/A	N/A		
Türkiye	Hatay	9.4	23.9		
Türkiye	Iğdır	N/A	N/A		
Türkiye	Isparta	3.7	24.7		
Türkiye	Istanbul	N/A	N/A		
Türkiye	Izmir	5.6	27.0		
Türkiye	Kahramanmaraş	4.4	29.6		
Türkiye	Karabük	0.5	22.1		
Türkiye	Karaman	8.4	15.6		
Türkiye	Kars	N/A	N/A		
Türkiye	Kastamonu	0.8	23.9		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Türkiye	Kayseri	2.8	27.3		
Türkiye	Kilis	N/A	N/A		
Türkiye	Kırıkkale	N/A	N/A		
Türkiye	Kırklareli	3.0	20.4		
Türkiye	Kırşehir	N/A	N/A		
Türkiye	Kocaeli	1.0	15.9		
Türkiye	Konya	3.6	15.3		
Türkiye	Kütahya	2.5	35.8		
Türkiye	Malatya	N/A	N/A		
Türkiye	Manisa	2.3	33.9		
Türkiye	Mardin	N/A	N/A		
Türkiye	Mersin	3.3	30.3		
Türkiye	Muğla	8.9	9.0		
Türkiye	Muş	N/A	N/A		
Türkiye	Nevşehir	N/A	N/A		
Türkiye	Niğde	1.8	21.8		
Türkiye	Ordu	0.3	10.3		
Türkiye	Osmaniye	4.7	21.2		
Türkiye	Rize	1.1	17.1		
Türkiye	Sakarya	0.7	20.3		
Türkiye	Samsun	1.3	30.1		
Türkiye	Şanlıurfa	N/A	N/A		
Türkiye	Siirt	N/A	N/A		
Türkiye	Sinop	2.0	24.8		
Türkiye	Şırnak	N/A	N/A		
Türkiye	Sivas	3.4	39.8		
Türkiye	Tekirdağ	5.5	15.6		
Türkiye	Tokat	0.8	21.8		
Türkiye	Trabzon	0.9	13.9		
Türkiye	Tunceli	4.3	14.8		
Türkiye	Usak	3.3	42.1		
Türkiye	Van	N/A	N/A		
Türkiye	Yalova	1.3	18.1		
Türkiye	Yozgat	1.0	36.5		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Türkiye	Zonguldak	0.5	22.8		
Turkmenistan	Ahal	N/A	N/A		
Turkmenistan	Aşgabat	N/A	N/A		
Turkmenistan	Balkan	N/A	N/A		
Turkmenistan	Daşoguz	N/A	N/A		
Turkmenistan	Lebap	N/A	N/A		
Turkmenistan	Mary	N/A	N/A		
Uganda	Adjumani	0.0	9.1		
Uganda	Apac	0.0	9.2		
Uganda	Arua	0.0	9.6		
Uganda	Bugiri	N/A	N/A		
Uganda	Bundibugyo	0.0	15.7		
Uganda	Bushenyi	0.0	14.6		
Uganda	Busia	0.0	8.4		
Uganda	Gulu	0.0	8.7		
Uganda	Hoima	0.0	12.9		
Uganda	Iganga	0.0	8.9		
Uganda	Jinja	N/A	N/A		
Uganda	Kabale	0.0	10.8		
Uganda	Kabarole	0.0	13.1		
Uganda	Kaberamaido	0.0	9.3		
Uganda	Kalangala	0.0	16.2		
Uganda	Kampala	2.5	6.3		
Uganda	Kamuli	0.0	8.7		
Uganda	Kamwenge	0.0	13.3		
Uganda	Kanungu	0.0	17.0		
Uganda	Kapchorwa	0.0	11.7		
Uganda	Kasese	0.0	13.4		
Uganda	Katakwi	0.0	8.3		
Uganda	Kayunga	0.0	9.2		
Uganda	Kibale	0.0	10.0		
Uganda	Kiboga	0.0	9.7		
Uganda	Kisoro	0.0	20.6		
Uganda	Kitgum	0.0	7.6		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Uganda	Kotido	0.1	7.6		
Uganda	Kumi	0.0	8.6		
Uganda	Kyenjojo	0.0	11.2		
Uganda	Lake Albert	0.0	9.3		
Uganda	Lake Victoria	0.0	9.5		
Uganda	Lira	0.0	9.0		
Uganda	Luwero	0.0	9.9		
Uganda	Masaka	0.0	9.6		
Uganda	Masindi	0.0	10.9		
Uganda	Mayuge	N/A	N/A		
Uganda	Mbale	0.0	10.8		
Uganda	Mbarara	0.0	9.7		
Uganda	Moroto	0.1	7.5		
Uganda	Moyo	0.0	8.1		
Uganda	Mpigi	0.0	8.8		
Uganda	Mubende	0.0	9.7		
Uganda	Mukono	0.0	12.2		
Uganda	Nakapiripirit	0.0	8.3		
Uganda	Nakasongola	0.0	8.9		
Uganda	Nebbi	0.0	9.0		
Uganda	Ntungamo	0.0	10.1		
Uganda	Pader	0.0	9.1		
Uganda	Pallisa	0.0	8.6		
Uganda	Rakai	0.0	10.6		
Uganda	Rukungiri	0.0	16.1		
Uganda	Sembabule	0.0	10.1		
Uganda	Sironko	0.0	10.5		
Uganda	Soroti	7.3	8.4		
Uganda	Tororo	0.0	9.1		
Uganda	Wakiso	0.0	8.8		
Uganda	Yumbe	0.0	9.0		
United Republic of Tanzania	Arusha	0.1	6.3		
United Republic of Tanzania	Dar es Salaam	N/A	N/A		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
United Republic of Tanzania	Dodoma	0.1	5.3		
United Republic of Tanzania	Geita	0.0	10.3		
United Republic of Tanzania	Iringa	0.0	7.4		
United Republic of Tanzania	Kagera	0.0	9.4		
United Republic of Tanzania	Kaskazini Pemba	N/A	N/A		
United Republic of Tanzania	Kaskazini Unguja	N/A	N/A		
United Republic of Tanzania	Katavi	0.0	9.7		
United Republic of Tanzania	Kigoma	0.0	10.4		
United Republic of Tanzania	Kilimanjaro	0.3	7.2		
United Republic of Tanzania	Kusini Pemba	N/A	N/A		
United Republic of Tanzania	Kusini Unguja	N/A	N/A		
United Republic of Tanzania	Lindi	0.0	10.4		
United Republic of Tanzania	Manyara	0.1	5.5		
United Republic of Tanzania	Mara	0.0	8.1		
United Republic of Tanzania	Mbeya	0.0	8.6		
United Republic of Tanzania	Mjini Magharibi	N/A	N/A		
United Republic of Tanzania	Morogoro	0.0	8.6		
United Republic of Tanzania	Mtwara	0.0	10.1		
United Republic of Tanzania	Mwanza	0.0	8.9		
United Republic of Tanzania	Njombe	0.0	8.8		
United Republic of Tanzania	Pwani	0.0	9.1		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
United Republic of Tanzania	Rukwa	0.1	9.3		
United Republic of Tanzania	Ruvuma	0.0	9.3		
United Republic of Tanzania	Shinyanga	0.0	9.2		
United Republic of Tanzania	Simiyu	0.1	7.7		
United Republic of Tanzania	Singida	0.0	6.0		
United Republic of Tanzania	Songwe	0.0	9.0		
United Republic of Tanzania	Tabora	0.0	8.7		
United Republic of Tanzania	Tanga	0.1	7.8		
Uzbekistan	Andijon	N/A	N/A		
Uzbekistan	Buxoro	N/A	N/A		
Uzbekistan	Farg'ona	N/A	N/A		
Uzbekistan	Jizzax	N/A	N/A		
Uzbekistan	Namangan	N/A	N/A		
Uzbekistan	Navoiy	N/A	N/A		
Uzbekistan	Qaraqalpaqstan	N/A	N/A		
Uzbekistan	Qashqadaryo	N/A	N/A		
Uzbekistan	Samarqand	N/A	N/A		
Uzbekistan	Sirdaryo	12.7	8.2		
Uzbekistan	Surxondaryo	N/A	N/A		
Uzbekistan	Tashkent	13.4	13.1		
Uzbekistan	Tashkent Shahri	N/A	N/A		
Uzbekistan	Xorazm	N/A	N/A		
Viet Nam	An Giang	0.3	14.4		
Viet Nam	Bà Rịa - Vũng Tàu	0.4	11.5		
Viet Nam	Bắc Giang	0.4	30.7		
Viet Nam	Bắc Kạn	0.4	34.2		
Viet Nam	Bạc Liêu	N/A	N/A		
Viet Nam	Bắc Ninh	0.1	3.2		
Viet Nam	Bến Tre	N/A	N/A		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Viet Nam	Bình Định	0.1	20.3		
Viet Nam	Bình Dương	0.4	24.2		
Viet Nam	Bình Phước	0.2	28.8		
Viet Nam	Bình Thuận	0.1	18.3		
Viet Nam	Cà Mau	N/A	N/A		
Viet Nam	Cần Thơ	0.6	18.5		
Viet Nam	Cao Bằng	0.7	41.7		
Viet Nam	Đà Nẵng	0.1	19.1		
Viet Nam	Đắk Lắk	0.1	27.3		
Viet Nam	Đắk Nông	N/A	N/A		
Viet Nam	Điện Biên	0.5	32.0		
Viet Nam	Đồng Nai	0.4	24.4		
Viet Nam	Đồng Tháp	0.4	13.0		
Viet Nam	Gia Lai	0.1	28.1		
Viet Nam	Hà Giang	1.1	34.4		
Viet Nam	Hà Nam	0.3	8.8		
Viet Nam	Hà Nội	0.1	8.9		
Viet Nam	Hà Tĩnh	0.6	25.6		
Viet Nam	Hải Dương	N/A	N/A		
Viet Nam	Hải Phòng	N/A	N/A		
Viet Nam	Hậu Giang	0.6	19.0		
Viet Nam	Hồ Chí Minh	0.7	21.4		
Viet Nam	Hoà Bình	0.2	24.2		
Viet Nam	Hưng Yên	0.2	5.3		
Viet Nam	Khánh Hòa	0.0	18.0		
Viet Nam	Kiên Giang	0.4	13.7		
Viet Nam	Kon Tum	0.1	17.8		
Viet Nam	Lai Châu	0.3	24.6		
Viet Nam	Lâm Đồng	0.1	22.2		
Viet Nam	Lạng Sơn	0.4	42.1		
Viet Nam	Lào Cai	0.8	36.5		
Viet Nam	Long An	0.8	24.0		
Viet Nam	Nam Định	N/A	N/A		
Viet Nam	Nghệ An	0.3	28.4		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Viet Nam	Ninh Bình	0.3	14.9		
Viet Nam	Ninh Thuận	0.1	14.1		
Viet Nam	Phú Thọ	0.5	30.4		
Viet Nam	Phú Yên	0.1	21.5		
Viet Nam	Quảng Bình	0.0	20.3		
Viet Nam	Quảng Nam	0.1	24.3		
Viet Nam	Quảng Ngãi	0.1	26.0		
Viet Nam	Quảng Ninh	0.7	35.5		
Viet Nam	Quảng Trị	0.0	30.2		
Viet Nam	Sóc Trăng	0.4	14.1		
Viet Nam	Sơn La	0.8	40.6		
Viet Nam	Tây Ninh	0.2	20.0		
Viet Nam	Thái Bình	N/A	N/A		
Viet Nam	Thái Nguyên	0.4	30.9		
Viet Nam	Thanh Hóa	0.2	25.9		
Viet Nam	Thừa Thiên Huế	N/A	N/A		
Viet Nam	Tiền Giang	0.6	15.5		
Viet Nam	Trà Vinh	N/A	N/A		
Viet Nam	Tuyên Quang	0.3	31.0		
Viet Nam	Vĩnh Long	0.7	18.8		
Viet Nam	Vĩnh Phúc	0.4	30.4		
Viet Nam	Yên Bái	1.0	34.8		
Zambia	Central	0.0	2.6		
Zambia	Copperbelt	0.0	10.7		
Zambia	Eastern	N/A	N/A		
Zambia	Luapula	0.0	10.1		
Zambia	Lusaka	0.0	8.3		
Zambia	Muchinga	0.0	8.9		
Zambia	North-Western	0.2	10.3		
Zambia	Northern	N/A	N/A		
Zambia	Southern	N/A	N/A		
Zambia	Western	N/A	N/A		
Zimbabwe	Bulawayo	0.0	3.5		
Zimbabwe	Harare	0.0	3.2		

Country	Subnational	Reversal risk factor (wildfire) (per cent)	Reversal risk factor (other natural) (per cent)	Reversal risk factor (human-induced) (per cent)	Reversal risk reduction factor (human-induced) (per cent)
Zimbabwe	Manicaland	0.1	5.3		
Zimbabwe	Mashonaland Central	0.0	6.6		
Zimbabwe	Mashonaland East	0.0	5.2		
Zimbabwe	Mashonaland West	0.1	6.0		
Zimbabwe	Masvingo	0.0	3.5		
Zimbabwe	Matabeleland North	0.0	4.2		
Zimbabwe	Matabeleland South	0.1	3.1		
Zimbabwe	Midlands	0.0	4.7		

Appendix 2. Methods used for deriving natural reversal risks

1. Definitions and Analytical Approach

1.1. Definitions

1. **IPCC risk definition:** The potential for adverse consequences resulting from the interaction of hazards, exposure, and vulnerability.

2. **Reversal:** For the purpose of identifying historical forest carbon losses, a reversal was defined as a net loss of at least 10% of live biomass (or carbon) over a given period. This relatively conservative threshold was chosen to account for uncertainties in carbon measurements (Wu *et al.*, 2026a). For the purpose of projecting future reversals to quantify the reversal risk assessment, this analysis only considered severe, stand-replacing natural disturbances. Consequently, this analysis does not estimate or incorporate low- and medium-severity disturbance events that cause carbon losses without leading to a stand-replacing disturbance.

3. **Risk:** Following the IPCC definition of risk, the calculation of reversal risk integrates several key elements of the amount of carbon potentially at risk (exposure), the probability of exposed carbon being lost due to disturbance, and the magnitude of carbon lost from disturbance. Reversal risk is expressed as percentage of forest carbon stock loss due to a given disturbance.

4. **Above-ground and below-ground carbon in forests:** Forest biomass carbon comprises above-ground carbon stored in stems, branches, bark, and foliage, and below-ground carbon stored in living root systems. No other reservoirs were included.

5. **Definition of forest pixel:** More than 10 per cent tree cover in the year 2000.

6. **100-year time horizon for analysis:** Selected based on direction that the Paris Agreement Crediting Mechanism (herein after referred to as “PACM”) uses a 100-year time horizon over which reversal risks are calculated, consistent with other carbon crediting mechanisms.

1.2. Analytical method

1.2.1. Grid-based reversal risk estimates in global forests

7. This Appendix 2uses the peer-reviewed ‘absolute reversal’ modelling approach from Wu *et al.* (2026a), with updated data to provide global coverage. The analysis involves five key steps, each of which is described below:

   (a) Developing forest growth curves;

   (b) Predicting the probability of disturbance over 10-year intervals;

   (c) Estimating the amount of carbon lost from disturbance;

   (d) Calculating the integrated 100-year probability of carbon reversal; and

   (e) Calculating the biophysical reversal risk that incorporates three components of risk.

8. The first step involved developing forest growth curves for each 8-km grid by fitting aboveground biomass (AGB) (ESA CCI AGB V4.0, (Santoro & Cartus, 2023)) as a function of stand age, mean annual temperature, and precipitation (ERA5, (Hersbach *et al.*, 2018)). Among 10 candidate growth functions fitted using maximum likelihood with gamma-distributed errors, the best-performing model was selected. Ecoregions (Xu *et al.*, 2021) with poor fits ($R^2 < 0.15$) were refitted at the biome level (Olson *et al.*, 2001). Models were trained using 70% of grid cells and tested on the remaining 30%.

9. The second step involved modelling the probability of stand-replacing disturbances. Forest disturbances were mapped using Global Forest Watch data (2001–2022) (Hansen *et al.*, 2013) at an original half-degree resolution and further re-gridded them to an 8-km grid. To isolate natural disturbances, tree cover loss associated with land-use change and intensive forest management was excluded, leaving areas affected primarily by wildfire, insects and disease, and windthrow. Disturbance area was converted to annual disturbance probability (% yr^{-1}) and modelled using a random forest approach based on historical climate (mean annual temperature and precipitation from ERA5), AGB, and biome, explaining 43.3% of the variance.

10. Future disturbance probabilities were projected by rerunning the model with climate projections from 22 CMIP6 Earth system models under a middle-of-the-road (SSP2-4.5) and a high-emissions (SSP5-8.5) future climate scenarios (e.g., as documented in Wu *et al.* (2026a) and Anderegg *et al.* (2022)). Following a pseudo-global-warming approach, projected climate anomalies were applied to observed ERA5 data to reduce biases in absolute climate projections. Annual disturbance probabilities were then converted to decadal probabilities using a binomial distribution and interpolated across managed forests using inverse distance weighting to generate wall-to-wall reversal risk maps.

11. The third step estimated carbon losses following disturbance. Because many disturbances are partial rather than stand-replacing, the fraction of biomass lost varies substantially among biomes and disturbance types. To capture this uncertainty, literature-based estimates of carbon loss due to a given disturbance were applied using a scenario analysis. For boreal and temperate forests, low-, moderate-, and high-severity scenarios were used corresponding to 38.5%, 71.6%, and 91.3% carbon loss, respectively (Thom & Seidl, 2016, Whittier & Gray, 2016). For tropical forests, carbon loss values of 45%, 55%, and 65% were used (Bullock & Woodcock, 2021). Following previous studies, it was assumed that the stand age resets to zero after disturbance (Pugh *et al.*, 2019). This leads to 9 total scenarios combining low-, moderate-, and high-severity disturbances across our two forest category types (temperate and boreal, tropical).

12. The fourth step integrated the growth, disturbance, and severity components into a demographic growth–mortality model on a common 8-km grid to estimate the 100-year probability of carbon reversal from natural disturbances. Simulations were restricted to areas with >10% tree cover in 2000. Forest age was initialized to 2010 and AGB was projected by decade using the best-fitting growth curve for each ecoregion. To account for stochastic disturbance occurrence, we conducted 100 Monte Carlo simulations by sampling binomial disturbance events from projected decadal disturbance probabilities. When a disturbance occurred, AGB was reduced according to the specified severity scenario and stand age was reset to zero. The integrated 100-year reversal probability was then calculated for each grid cell using equations (1) and (2).

$$p10_{reversal}(j) = \frac{N(j)}{100}$$ Equation (1)

13. Where $p10_{reversal}(j)$ is the decadal carbon reversal probability due to natural disturbances for a given 8 km-grid, j represents the 2020s, 2030s, …, 2090s), $N(j)$ is the number of simulations from the total of 100 where (1) a disturbance occurred and (2) the net of AGB loss and regrowth during decade j was 10% or lower than AGB in the 2010s. Here, we used AGB as a proxy of total live biomass carbon to identify a reversal under our 10%-threshold rule because we approximated total live biomass from AGB * (1 + root:shoot). The integrated 100-year carbon reversal probability ($p100_{reversal}$, %) due to natural disturbances was calculated using equation (2).

$$p100_{reversal} = 100 \times \left(1 - \prod_{j=2020s}^{n} \left(1 - p10_{reversal}(j)\right)\right)$$ Equation (2)

14. Where n represents 10 decades - eight decades from the 2020s to 2090s and then a repeat of 2080 and 2090 (since there are no climate data for 2100 and 2110) to integrate probabilities over a full 100 years.

15. The fifth step calculated the biophysical reversal risk (or buffer pools) that provide the absolute magnitude of carbon loss by combining the integrated 100-year carbon reversal probability, and the disturbance severity (i.e., the ratios of carbon losses where a reversal event occurs due to a given disturbance dependent on biomes: 38.5%, 71.6%, and 91.3% for boreal and temperate forests, and 45%, 55%, and 65% for tropical forests) and a map of total (aboveground and belowground) live biomass carbon exposure map (equation (3). For total live biomass carbon, we used a map of global AGB circa 2017 from the ESA CCI AGB product V4.0 (Santoro & Cartus, 2023) and a spatially explicit estimate of root:shoot ratio dataset at ~1km spatial resolution (Huang *et al.*, 2021). Spatially, we resampled all datasets to a common 8 km × 8 km grid by a bilinear interpolation method.

$$ReversalRisk_{Abs} = p100_{reversal} \times ratio_{Closs} \times C_{tot} \times 3.667$$ Equation (3)

16. Where $ReversalRisk_{Abs}$ is the maps of the biophysical reversal risk ($tCO_2eq\ ha^{-1}$) to compensate for disturbance-driven reversals across global forests, $ratio_{Closs}$ is the disturbance severity, C_{tot} is the total (aboveground and belowground) live biomass carbon stocks ($t\ ha^{-1}$), and 3.667 is a scaling factor from carbon to CO_2eq.

1.2.2. Apportion risk based on regional carbon stocks

17. It is noted that translating tonne-based results from equation (3) into a parameter expressed in terms of the percentage of credited carbon stocks, as is commonly used in the design of reversal risk and buffer pools in real-world carbon crediting programmes, depends on the technical details of carbon crediting methodologies and individual projects.

18. Divide the reversal risk by the current regional total live biomass carbon using equation (4). This yields a reversal risk as a percentage.

$$\text{ReversalRisk}\ (\%) = 100 \times \frac{ReversalRisk_{Abs}}{\text{TotalC}}$$ Equation (4)

19. Where $\text{ReversalRisk}\ (\%)$ is the reversal risk as a percentage, TotalC is the regional total live biomass carbon stocks ($t\ ha^{-1}$).

1.2.3. Separating the overall risk into two categories: wildfire and all other natural risks

20. Extracting the 2001-2022 ratio between wildfire-driven forest losses and all disturbance-driven forest losses ($ratio_{WF}$) based on the data from Acil *et al.* (2025). Decompose the reversal risk to 'Wildfire' versus 'All other disturbances' using equations (5) and (6).

$$\text{ReversalRisk}_{\text{Wildfire}}\ (\%)\ =\ ratio_{WF}\ \times \text{ReversalRisk}$$ Equation (5)

$$\text{ReversalRisk}_{\text{AllOther}}\ (\%)\ =\ (1 - ratio_{WF})\ \times \text{ReversalRisk}$$ Equation (6)

Where:

$\text{ReversalRisk}_{\text{Wildfire}}$ (%)	=	is the reversal risk from wildfire
$\text{ReversalRisk}_{\text{AllOther}}$ (%)	=	is the reversal risk from all other disturbances

1.2.4. Aggregating grid-based estimates to broader geographies

21. 8-km grid-level reversal risk estimates were aggregated into sub-national, national, and multi-national units using the official boundaries from Global Administrative Areas. (GADM). Aggregation was performed as a tree-cover-weighted average of grid-level reversal risks within each geographical unit. are each combined with two climate scenarios (SSP2-4.5 and SSP5-8.5), yielding 18 scenarios in total. Severity scenarios are broken into low, medium, and high and specified for two categories: (1) tropical forests and (2) temperate and boreal forests (Table 1).

Table 1. The 9 disturbance severity scenarios used in global analysis by combining the conditions where AGB was reduced by 38.5%, 71.6%, and 91.3% for temperate and boreal forests, and 45%, 55%, and 65% for tropical forests, based on literature assumptions

Boreal & temperate forests (bt) **Tropical forests (tr)**	**38.5% AGB lost (low)**	**71.6% AGB lost (medium)**	**91.3% AGB lost (high)**
45% AGB lost (low)	tr45bt385	tr45bt716	tr45bt913
55% AGB lost (medium)	tr55bt385	tr55bt716	tr55bt913
65% AGB lost (high)	tr65bt385	tr65bt716	tr65bt913

1.3. Discussion of reversal risk definition

22. As indicated above, this analysis defines reversals in two different ways:

(a) When calculating reversals, the method identifies a reversal only when there is a net loss of at least 10% of live biomass (or carbon) over a given period; and

(b) When projecting future reversals, the method only projects stand-clearing disturbances (i.e., only high-severity disturbance events).

23. The PACM defines the meaning of a reversal in paragraph 20 of the "Standard: Addressing non-permanence and reversals in mechanism methodologies" which reads as follows:

(a) "A reversal occurs during an Article 6.4 activity's active crediting period when the net change in storage is less than zero ($\Delta S_t < 0$) in the monitoring report for any monitoring period after the first one (i.e., for $t \geq 2$), with the quantity of the reversal specified by ΔS_t."

24. In general, the definitions used in this analysis and in the "Standard: Addressing non-permanence and reversals in mechanism methodologies"(A6.4-STAN-METH-007) (herein after referred to as "Reversals Standard") are aligned. However, there are two differences that may be worth considering:

(a) The historical component of this analysis uses a 10% threshold, which does not count any observed carbon loss events as "reversals" when they reduce carbon stocks by less than 10% (i.e., $\Delta S_t < 0.1 \times S_{t-1}$). Because the Reversals Standard defines a reversal to include any loss of carbon, this methodological choice likely underestimates total reversals as that concept is defined in the Reversals Standard. The 10% threshold was adopted to align with peer-reviewed methods that were designed for inventory-based data sources, which feature some uncertainty and noise in the primary source data that may not reflect true carbon losses (Wu *et al.*, 2026a). In that context, the use of a 10% threshold was selected to increase accuracy, and it is maintained here for consistency.

(b) The forward-looking component of this analysis looks only at stand-clearing disturbance events, which lead to high-severity carbon losses. By design this approach does not include relatively low-severity disturbance events, which are expected to occur, but which are not included in the method or results here. Since the Reversals Standard defines a reversal to include any loss of carbon, this methodological choice likely underestimates total reversals as that concept is defined in the Reversals Standard. In the long run high-severity disturbance events are likely to be the dominant driver of carbon stock changes, and thus the focus here is appropriate for analysing the most significant long-term effects of natural reversal risks. However, less severe disturbance events would require carbon credits to be retired in the buffer pool, even if in relatively smaller quantities compared to the stand-clearing disturbances modelled here.

2. Results

25. Results are provided for two different variables:

(a) Wildfire risks only;

(b) All other natural risks, other than wildfire.

26. Total natural risks are the sum of the other two categories (i.e., wildfire is statistically independent from non-wildfire natural risks).

27. Results provided at the following geographical resolution levels:

(a) Subnational;

(b) National;

(c) Multinational.

28. 18 scenarios (9 disturbance scenarios x 2 climate scenarios) for each of 3 variables (total natural, wildfire, all other natural risks), reported at 3 spatial aggregations (subnational, national, multi-national).

29. For each result, the number in the output file represents the fraction of credited carbon in percentage that is projected to be lost to reversals from total natural risks, wildfire only, or all non-wildfire natural risks, respectively, as calculated over a 100-year period.

Note: the country defined in this analysis is from the definition in GADM; per GADM data, a "country" is any entity with an ISO country code.

3. Recommendations

3.1. Recommended scenario use

30. The three scenarios recommended for use in the reversal risk assessment tool under PACM, are tr55bt716 (medium-medium), tr45bt385 (low-low), and tr65bt913 (high-high) as shown in Table 1, All three scenarios are based on the SSP2-4.5 climate scenario. At this stage, the medium-medium scenario, tr55bt716, has been selected for use in the tool, as there is no clear reason to adopt the high-high scenario and no sufficient justification for selecting the low-low scenario. The natural reversal risk values based on the tr55bt716 disturbance scenario and the SSP2-4.5 climate scenario are presented in Appendix 1 of this methodological tool.

31. SSP2-4.5 represents a moderate-emissions pathway with climate projections that are broadly consistent with current policy commitments. Because disturbance severity remains poorly constrained by observations, these three scenarios provide a practical range of reversal risk estimates, spanning conservative lower-bound, central, and upper-bound assumptions. Based on the results of Wu *et al.* (2026b), reversal likelihoods exhibited similar magnitudes and spatial patterns under the two climate scenarios, suggesting that uncertainty associated with disturbance severity is substantially greater than that associated with future climate projections. Therefore, the selected scenarios primarily represent a gradient of disturbance severities rather than climate scenarios.

32. Given their relative influence on the results, it may be more useful to place greater emphasis on uncertainty across the disturbance scenarios, while also acknowledging the role of climate scenario selection. Although the higher climate impacts scenario can be expected to produce greater reversal risks for factors like wildfire, it also increases forest growth rates, such that these effects partially cancel one another out. As a result, the difference in projected reversal risk factors between the climate scenarios is much smaller than the difference in projected reversal risk factors across disturbance scenarios.

3.2. Application to clean cooking activities

33. Paragraph 6 of the “Methodological tool[1]: Fraction of non-renewable biomass” (A6.4-AMT-009) defines the fraction of non-renewable biomass as:
“The proportion of harvested biomass that exceeds the natural rate of regeneration of the landscape during a given period.”

34. This term is used in carbon crediting methodologies to determine the number of carbon credits to give to clean cooking projects and other projects that reduce the consumption of non-renewable biomass.

35. Based on this understanding, it is appropriate to use the results developed in this report to quantify reversal risks from credited non-renewable biomass. Non-renewable biomass

[1] See https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-64-pacm/mechanism-process/methodologies/a64-amt-009

consumption would reduce forest carbon stocks over a given period, which is broadly aligned with the definition of a reversal used for this report. As discussed in section 1.3, however, the methodology described here is likely to underestimate reversal risks from natural disturbances.

3.3. Future updates

36. Although there is a substantial body of peer-reviewed literature documenting how to assess historical rates of forest carbon disturbance and how to project future disturbance rates and associated forest carbon losses, the literature combining these data and methods into an integrated approach is relatively newer. It is likely that this literature will continue to develop additional insights in the coming years, e.g., to better constrain uncertainties and improve the quantification of reversal risk assessment.

37. A reassessment every 2–3 years is recommended to incorporate advances in data availability, methodological approaches, and scientific knowledge in this rapidly evolving field.

38. It is also possible that updated estimates may be available sooner than 2–3 years, for example, to reduce the uncertainty associated with the scenario analysis or to improve the disturbance monitoring and approach. If a significant improvement were published earlier than 2–3 years from now and demonstrated a more accurate set of results, that could justify an earlier update.

39. All the regulatory documents under the PACM are subject to periodic review and may be revised or updated where necessary at least every 5 years. Although there may be value in a more frequent update of these values to reflect the best available science that may emerge before the full 5-year period is done, 5 years is a reasonable maximum period for which to use any set of values.

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