Compilation and synthesis of indicators, approaches, targets and metrics for reviewing overall progress in achieving the global goal on adaptation

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I. Introduction and background

1. SB 56 requested the secretariat, under the guidance of their Chairs, to compile and synthesize, by August 2022, indicators, approaches, targets and metrics that could be relevant for reviewing overall progress towards achieving the GGA, building on the 2021 technical paper by the Adaptation Committee, while also taking into account other relevant reports, communications and plans under the Convention and the Paris Agreement, UNEP, IPCC, the 2030 Agenda for Sustainable Development and the Sendai Framework, relevant multilateral frameworks and mechanisms, United Nations organizations and specialized agencies, and the discussions at the first workshop under the Glasgow–Sharm el-Sheikh work programme.[1]

2. Article 7.1 of the Paris Agreement established the GGA for enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal referred to in Article 2.

3. In response to the abovementioned mandates, this technical paper compiles and synthesizes information and explores ideas and examples of indicators, approaches, targets and metrics relevant to the GGA. It further offers possible questions for future consideration of the topic, including at the upcoming third workshop under the Glasgow–Sharm el-Sheikh work programme, on methodologies, indicators, data and metrics, monitoring and evaluation.[2] The annex to the paper summarizes information on the various methods and approaches available.

II. Landscape of indicators, approaches, targets and metrics that could be relevant for reviewing overall progress made in achieving the global goal on adaptation

A. Definitions and relations between key terms

4. Although the terms ‘indicator’ and ‘metric’ are often used interchangeably, there are differences between them. For example, key performance indicators are more strategic, higher-level measures of progress whereas metrics provide overall data, such as the number of visits to a website. In some cases, indicators have a set of metrics embedded in them that determine the kind of data that are being collected for a specific theme or measure.

5. Long-term goal setting in particular is often complex, given future uncertainties and difficulties in articulating a long-term vision that can be implemented over time. Long-term strategies require such key factors to be in place, such as continuous political commitment (e.g. clear high-level mandates for collaborations), institutional arrangements (e.g. a multitude of stakeholder groups across ministries and sectors), legal frameworks (e.g. supporting coherence across strategies and reducing conflicting policies) and stakeholder engagement (e.g. informing the shared vision and assisting with implementation). There is

[1] FCCC/SBI/2022/10, para.190 and FCCC/SBSTA/2022/6, para.157.

[2] https://unfccc.int/topics/adaptation-and-resilience/workstreams/glasgow-sharm-el-sheikh-WP-GGGA

also the need to build on existing strategies and plans, and to understand the baseline conditions upon which the long-term strategy builds.[3]

6. The traditional view of goal setting partly ignores, however, the potential innovations and emerging opportunities that are often found in, for example, frontier technologies, new online platforms and associated services that often require new skills and capacities that simply do not yet exist. Only building on "what is now" is not necessarily a robust guide in setting long-term visions and goals.[4] Forward-looking indicators and approaches are therefore crucial, as they allow flexibility in developing a shared vision of the future with flexible indicators that can be adjusted when the operating conditions change. The climate adaptation community is actively conducting scenario and visioning exercises which aim to both pose questions about the "end destination" (i.e. what a well-adapted community or sector looks like) and develop benchmarks and indicators for future adaptation that can effectively measure progress towards the destination.[5]

7. Some of the key questions that remain are what can be aggregated at the global level, what at the national level and how these levels are interlinked to support the GGA (Adaptation Committee technical paper, 2021). For example, countries' adaptation goals may not align with each other. One country may try to defend a threatened coastal area whereas another may choose managed retreat from the coast. In addition, one country's adaptation (e.g. cutting down large tracts of forests or channelling floodwater downstream) can have significant global implications for the adaptation of other countries and overall global adaptation progress. This illustrates the need to also consider transboundary climate risks and adaptation,[6] both in terms of impacts and the broader benefits, as the world becomes more interconnected. The transboundary nature of climate risks, impacts, adaptation and vulnerabilities therefore is an additional consideration that has direct significance for the GGA, its conceptualization and associated indicators, approaches, targets and metrics.

B. Possible indicators, approaches, targets and metrics for reviewing overall progress towards the global goal on adaptation

8. This section describes reports and studies that provide insight into how the GGA can be determined and what it might contain. In some cases, these resources address indicators that could be useful in determining goals for the GGA. It then considers reports and studies that provide insight on measurement of progress towards achieving the GGA. These resources tend to be technical and often focus on specific metrics, so may be particularly useful for the GST.

1. Reports and studies providing insight on setting a global goal on adaptation

9. This section is subdivided into those resources that directly affect climate change adaptation and those that address related goals.

[3] https://www.wri.org/climate/what-long-term-strategy.

[4] Johnson M W and Suskewicz J. 2020. *Lead from the future: How to turn visionary thinking into breakthrough growth*. Boston, MA: Harvard Business Review Press, p. 237.

[5] Nalau J and Cobb G. 2022. The strengths and weaknesses of future visioning approaches for climate change adaptation: a review. *Global Environmental Change*. 74 (102527). Available at https://doi.org/10.1016/j.gloenvcha.2022.102527.

[6] Benzie M and Harris K. 2020. Transboundary climate risk and adaptation. Science for Adaptation Policy Brief 2. Nairobi: The World Adaptation Science Programme Secretariat, UNEP. Available at https://wasp-adaptation.org/images/Resources/WASP_Science_for_Adaptation_Policy_Brief_No._2.pdf.

(i) Climate change-specific resources

(a) Synthesis report for the technical assessment component of the first global stocktake on the state of adaptation efforts, experiences and priorities

10. The synthesis report, prepared by the secretariat under the guidance of the co-facilitators of the technical dialogue of the first GST and issued in 2022,[7] outlined scientific literature and work that may be relevant in the context of the GGA. It provided insights into how adaptation progress is currently being assessed at different levels and the ways such adaptation information is currently gathered.

11. The report aimed to show the collective state of adaptation by presenting information on 10 key global climate risks (temperature increase, extreme temperatures, heavy precipitation, cyclones and storms, flooding, droughts, sea level rise, ocean acidification, loss of sea ice and ocean chemistry change), and synthesizing information on national projections and responses to each of these risks. This presented a snapshot of countries' collective progress, in preparing for global climate risks. The report further offered a variety of key messages, including on the GGA, where it provided orientation to adaptation efforts, in particular through temperature links, and global risks as opposed to national assumptions and responses.

12. The report also highlighted the important role of transboundary approaches and outlined several challenges to assessing collective progress, such as methodological, empirical and conceptual challenges in agreeing what can be assessed, on what basis, and lack of agreement on some of the key terms and concepts. Further, it noted the many examples of indicators, approaches and metrics that could be relevant to the GGA, many of which are further expanded upon in the present report.

(b) Summary report of the first workshop under the Glasgow–Sharm el-Sheik work programme

13. The workshop[8] was held on 8–9 June 2022, on enhancing understanding of the GGA and reviewing progress towards it, during SB 56 and following an IPCC event also under the Glasgow–Sharm el-Sheikh work programme on the contribution of Working Group II to the Sixth Assessment Report of the IPCC on 7 June 2022. The workshop was webcast and attracted over 400 participants. Parties had discussions around three key questions, namely how the GGA can be conceptualized, good practices of goal-setting at different levels in other relevant fora and what are relevant examples of targets and goals at different levels.

14. The discussion on the conceptualization of the GGA included the themes of principles, components, characteristics, scales and thresholds, linkages, and methods and approaches, and reached the following conclusions:

(a) The GGA should be aligned with the principles of the Convention and the Paris Agreement, and provisions of Article 7.2 of the Paris Agreement should be underscored, namely recognizing that adaptation is a global challenge faced by all at various levels (local, subnational, national, regional and international) and that it requires a long-term global response that protects people, livelihoods and ecosystems;

(b) Provisions referred to in Article 7.14 of the Paris Agreement should be central components of the GGA. These include recognizing the adaptation efforts of developing countries, enhancing the implementation of adaptation action, reviewing the adequacy and effectiveness of adaptation action and support, and reviewing the overall progress towards achieving the GGA;

(c) The key characteristics of the response to the GGA are that they should be a long-term rather than only an urgent and immediate response; be country-driven and reflecting the national context; be holistic, comprehensive and reflecting transboundary and cascading climate impacts and risks; encompass local and indigenous knowledge and

[7] Available at https://unfccc.int/documents/470435.

[8] The concept note for, and webcast of, the workshop are available at https://unfccc.int/topics/adaptation-and-resilience/workstreams/glasgow-sharm-el-sheikh-WP-GGGA#eq-3.

consider women, youth and vulnerable groups; and consist of different targets while allowing the adjustment of these through time, for example if climate risks increase. The targets should be reviewed after each GST and in the light of any new IPCC findings or other recommendations;

(d) The GGA could have several targets at different scales (e.g. global, regional, national and local) and use a layered approach with different thresholds of action and ambition for the outcome of adaptation, for example ranging from a "survival threshold" to a "transformation threshold". The GGA should be more ambitious than simply maintaining the status quo;

(e) Discussions of existing practices of goal setting under other forums included consideration of the SDGs and Sendai Framework and their current indicators (top-down) and what countries are reporting in their Adaptation Communications (bottom-up) to see what can be synthesized and any new indicators that need to be developed under the GGA;

(f) Relevant examples of targets and goals at different levels provided a wealth of examples from different countries and sectors that could be relevant for the GGA. These ranged from NDCs to SDGs and the Sendai Framework to quantitative global targets (e.g. 1 billion people protected by early warning systems; finance flows and costs of climate impacts reaching 1.5 ℃ as opposed to 2 ℃), and data from NAPs and NAPAs.

15. The insights from Parties illustrate the wide variety of possibilities in developing the GGA.

(c) The Sustainable Development Goal indicator framework and tier classification approach, and the Sustainable Development Goal monitoring methodologies of the United Nations Environment Programme

16. The SDG indicators[9] include 16 goals and 23 indicators that are either directly or indirectly tied to climate change impacts and adaptation. These include the measurement of climate impacts such as disaster deaths and losses; implementation of adaptation plans and measures; measurement of outputs such as improved water and sanitation; and outcomes such as reducing deaths and destruction from extreme events. While the SDG goals and indicators cover many important consequences of climate change and adaptation, specific consequences and adaptation in a number of key aspects such as coastal resources, flooding, some aspects of human health impacts such as heat stress, terrestrial and freshwater ecosystems, are not included. Thus, the GGA could build on the approach used in the SDGs and apply them to additional sectors to develop adaptation targets and indicators.

(d) The Sendai Framework for Disaster Risk Reduction

17. The Sendai Framework includes seven global targets to achieve its overall goal of preventing new and reducing existing disaster risk, preventing and reducing hazard exposure and vulnerability to disaster, and increasing preparedness for response and recovery to strengthen resilience.[10] The targets are monitored through 38 global indicators that have been agreed upon and adopted by the United Nations General Assembly, by its resolution 71/276.[11] Currently, 155 Governments are using the Sendai Framework Monitor[12] to report on progress against the indicators. Some of the global indicators are tied to targets of SDGs 1, 11 and 13[13] and are also used to monitor the implementation of intergovernmental frameworks such as the small island developing States Accelerated Modalities of Action Pathway and the NUA. The global targets include terms such as "substantially reduce … by 2030" and so are time-based targets but do not include any figures to define a substantial reduction and are expected to be assessed through the monitoring indicators. The annual reports of the Secretary-General

[9] https://unstats.un.org/sdgs/iaeg-sdgs/tier-classification/

[10] https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030.

[11] https://digitallibrary.un.org/record/859424.

[12] https://sendaimonitor.undrr.org.

[13] https://www.preventionweb.net/sendai-framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals.

provide the current status of achievement of the seven targets. The global indicators are further complemented by national indicators used by countries to report on their disaster risk reduction progress, which can be contextualized and linked to national priorities.

18. The midterm review of the Sendai Framework, which is due to conclude in 2023, aims to mobilize and direct the necessary means of implementation, including partnerships and transdisciplinary collaboration, and support the identification of solution pathways and good practices. It will therefore set the base for further strengthening of the disaster-related data ecosystem to benefit complementary mechanisms.

19. UNDRR is due to release a global assessment report in 2023 that will focus on metrics and measures to build resilience in a changing climate. The report will build on existing conceptual and practical learning and explore methods and metrics to allow Governments to frame their actions for building resilience.

(e) United Nations Environment Programme adaptation gap reports

20. The UNEP adaptation gap reports[14] assess progress in planning, implementing and financing adaptation, and assess the extent to which such investments will sufficiently reduce vulnerability to climate change. The UNEP AGR chapter on planning has already been described in the Adaptation Committee report.

21. The UNEP Adaptation Gap Report 2021 addresses financial needs and support for adaptation. It notes that research found that the estimates of financial needs for adaptation are increasing, with between USD 280 and 500 billion needed each year, as of 2030, to adapt to global warming of between 2 and 4 °C. Approximately three-quarters of the financial needs are estimated to be in agriculture, infrastructure, water resources and disaster risk reduction. Meanwhile financing for adaptation is below USD 100 billion per year. The report also covers private sector finance. Funding for adaptation is tracked using the OECD Development Assistance Committee Rio Markers of "principal" and "significant".

22. In assessing global progress on adaptation implementation, the UNEP Adaptation Gap Report 2021 estimates that 2,600 principal adaptation projects were funded between 2010 and 2019 by the top 10 bilateral donors (including the EU, but not including multilateral banks) and reports results on annual basis. In spite of increased financing and an increase in the number of adaptation projects, the 2020 report found that there was very limited evidence of climate risk reduction. Thus, both the 2020 and 2021 reports conclude that, although it is difficult to measure the effect of adaptation investments (namely, the outcomes), it appears that adaptation investments are not keeping up with estimated adaptation needs and the adaptation gap is increasing. A key methodological gap may lie in the capacity to tie adaptations to outcomes.

(f) The contribution of Working Group II to the Sixth Assessment Report of the IPCC

23. The contribution of Working Group II to the Sixth Assessment Report of the IPCC[15] provides several approaches that could be useful when discussing the GGA:

(a) The IPCC uses "burning embers" that provide a data-driven, yet somewhat subjective approach, in using different adaptation scenario narratives: proactive, incomplete and limited adaptation. For example, in the health context (e.g. chap. 7 of the report), these can be used to estimate different risk levels in the context of changing global mean temperatures, for example to compare the different risk levels for malaria or heat-related morbidity and mortality between proactive adaptation and limited adaptation. Using "burning embers" can give indications of the benefits of adaptation actions, in particular for protecting threatened and unique systems, adapting to increasing extreme weather events, addressing inequities caused by climate change and ensuring sustainable development. "Burning

[14] See, for example, e.g., UNEP United Nations Environment Programme. 2021. "Adaptation Gap Report 2021: The gathering storm – Adapting to climate change in a post-pandemic world." Nairobi:, UNEP United Nations Environment Programme (2021). Adaptation Gap Report 2020. Nairobi https://www.unep.org/resources/adaptation-gap-report-2020

[15] https://www.ipcc.ch/report/ar6/wg2/.

embers" can also be projected into the future in a changing climate and demonstrate the feasibility of adaptations in the temperature context;

(b) The contribution of Working Group II to the Sixth Assessment of the IPCC used the feasibility framework (chap. 18) to identify the feasibility and effectiveness of adaptation options against different temperature levels while also highlighting potential linkages with mitigation. The framework evaluates the feasibility of various adaptation options in the context of the five system transitions necessary to enable a transition to a more sustainable world, namely land, ocean, coastal and freshwater ecosystems; urban, rural and infrastructure; energy; industry; and society. The framework assesses six feasibility categories, namely economic, technological, institutional, social, environmental and geophysical, within which different types of representative key risk are assessed with different adaptation options. For example, under the land and ocean ecosystem transition, representative key risk coastal socio-ecological system adaptation options such as coastal defence and hardening are assessed in terms of their potential overall feasibility, synergies with mitigation (if any) and a more detailed assessment of the feasibility of the option across the six categories. The feasibility of a given option and its synergies with mitigation are assigned a confidence level of either low, medium or high. The framework also examines the linkages of adaptation options to the SDGs and outlines which SDGs each adaptation option supports;

(c) The contribution of Working Group II to the Sixth Assessment of the IPCC outlines another framework that provides guidance on how to achieve climate-resilient development. It links adaptation to sustainable development and considers system transitions, transformation, sustainable development action, adaptation and mitigation together. Key concepts that could be adjusted as potential indicators include well-being, low poverty, ecosystem health, equity and justice, low global warming levels and low risk that would demonstrate a climate-resilient world. Climate-resilient development outlines dimensions that enable actions towards higher climate-resilient development that include knowledge diversity, inclusion, equity and justice, and ecosystem stewardship. All of these are embedded in arenas of engagement, where decisions are made across sectors and diverse stakeholder groups.

(g) Adaptation Fund results tracker[16]

24. The results tracker of the Adaptation Fund provides a set of goals and related outcomes that have specific indicators. For example, goal 1 is for the Adaptation Fund to disperse funding to the most vulnerable countries through the mandate of the UNFCCC. Outcome 1 in relation to goal 1 is to reduce exposure to climate-related hazards and threats, where one indicator is that risk and hazard information has been disseminated. Time frames for the outcomes and indicators are project-based and should be tracked at the beginning, middle and end of an adaptation project. Indicators report on the number of institutions or percentage of activities that have reduced vulnerability and enhanced adaptive capacity. However, the guidance and indicators, while providing goals relevant to GGA, focus on current time frames and do not as such seek to evaluate adaptation outcomes in 5–10 years' time, even if such work is taking place under other processes within the Adaptation Fund.

(h) The horizontal assessment scoreboard of the European Commission

25. The EU Strategy on adaptation to climate change[17] contains eight actions with multiple objectives and uses a horizonal adaptation preparedness scoreboard which encompasses a range of indicators. It is explained in detail in the 2021 Adaptation Committee

[16] Adaptation fund results tracker guidance document at: https://www.adaptation-fund.org/wp-content/uploads/2016/04/AF-ResultstrackerGuidance-final2.pdf.

[17] EU Strategy on adaptation to climate change at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0216&from=EN.

report.[18] In 2021, the European Commission published a new Strategy,[19] in which it states its intention to build upon the experience gained from the scoreboard to develop further suitable adaptation indicators.

(i) The Race to Resilience Metrics Framework

26. The Race to Resilience Metrics Framework,[20] aligned with Race to Zero and led by the high-level champions for climate action, aims to catalyse global ambition for climate resilience by actors outside national Governments in order to build the resilience of 4 billion people from vulnerable groups and communities by 2030, with a focus on urban, rural and coastal impact areas. The Race to Resilience pledge requires its participants to put forward initiatives where they commit to delivering inclusive and equitable actions that benefit over 100,000 people and to share knowledge and collaborate with other initiatives in order to increase and drive ambition, and to making sure that the initiative has active and growing membership.

27. The Race to Resilience Metrics Framework provides models for project reporting. For example, at the individual level, eight projects providing disaster-resistant improvements to housing (output) leads to 25,000 individuals having improved disaster-resilient housing units (outcome), that in turn leads to 25,000 individuals having increased resilience (pledge). The framework tackles critical challenges in measuring resilience by providing high-level metrics that accommodate multiple definitions of resilience and a broad range of activities. While the metrics used are high-level and the time frame for building resilience is by 2030, the campaign also recognizes the increased future vulnerability of people potentially exposed to climate risks, for example, the possible high vulnerability of 2.4 billion people if the temperature has risen by an average of 2 ℃ by 2050.

(j) United Nations target for global coverage of early warning systems within five years

28. In March 2022, the Secretary-General set a target[21] to ensure that every person on Earth is protected by early warning systems within five years. Some regions, such as Africa, currently only have 60 per cent coverage. The target will be implemented by the World Meteorological Organization and will require funding of at least USD 1.5 billion in the next five years to improve the situation and coverage, in particular in the least developed countries and small island developing States. A global plan for implementation will be developed before COP 27, with the World Meteorological Organization leading the work of a range of partners. This initiative is an example of a specific target that can be readily measured and appears to be consistent with the GGA.

(k) World Bank Group Resilience Rating System

29. This rating system[22] has two different focuses, namely resilience for and resilience through a project. The former considers project-specific resilience, for example project design, and the latter considers whether a project provides wider benefits or increases resilience beyond the project. The system relies on a set of key questions as to whether a project is considering climate and disaster risks in the design of the assets; for example, whether increases in climate impacts are being considered when a new bridge is being built. The rating system uses three different levels that each have different levels of risk assessments embedded and follows a decision tree to assess which level of rating is needed for a given project. The time frame depends on the individual project; and is not forward-looking as such, as ratings are based on existing data, project design and its application. To receive the highest rating, the project must be transformational in improving resilience. This

[18] Adaptation Committee technical paper on "Approaches to overall progress made in achieving the global goal on adaptation" at: https://unfccc.int/sites/default/files/resource/AC_TP_GlobalGoalOnAdaptation.pdf.

[19] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN.

[20] Race to resilience metrics framework at: https://racetozero.unfccc.int/wp-content/uploads/2021/11/202111_R2R_Metrics_framework.pdf.

[21] https://public.wmo.int/en/media/press-release/%E2%80%8Bearly-warning-systems-must-protect-everyone-within-five-years.

[22] https://openknowledge.worldbank.org/handle/10986/35039.

system could be adjusted to a more forward-looking approach and indicators if the different levels were based on adaptation goals with longer time frames. For example, the lowest level could be the minimum that needs to be achieved for climate adaptation whereas the highest could correspond to a comprehensive approach to adaptation. This approach is similar to the four-tier adaptation goals described below.

(ii) Other useful resources

(a) United Nations Environment Programme report on Measuring Progress Towards an Inclusive Green Economy[23]

30. The UNEP report presents a set of indicators that can be used to measure progress towards a green economy. The indicators cover such broad topics as growth in environmental goods and services, human capital and natural capital. The green growth indicators can help in tracking human well-being, social equity, environmental risks and ecological scarcities. Some of these indicators may be too broad to support tracking of adaptation effectiveness. This broad set of indicators includes conventional pollutants, carbon emissions and other indicators that provide insight on human health and environmental well-being. The latter set of indicators on human health and the environment could be used to track progress in meeting outcomes and could complement the indicators related to disasters of the SDGs and Sendai Framework.

31. Human health and environment indicators include:

(a) Forested areas (ha);

(b) Water stress (percentage of water systems under stress);

(c) Land and marine conservation areas (ha);

(d) Water productivity (m^3/USD of economic output).

32. Relevant well-being indicators include access to:

(a) water (per cent);

(b) sanitation (per cent);

(c) health care (per cent).

33. Such indicators may be useful to measure exposure to climate risk and adaptive capacity. The report also mentions tracking the number of people hospitalized because of air pollution. Since climate change can help air quality deteriorate, this indicator could be used to measure whether climate change may be adversely affecting human health through decreased air quality.

(b) The New Urban Agenda Monitoring Framework

34. The NUA Monitoring Framework[24] is a tracking tool to monitor the progress in implementing the NUA and supports the Guidelines for Reporting on the Implementation of the New Urban Agenda[25]. The Framework specifies 77 indicators for sustainable urban development, some of which are closely aligned with, or the same as, the targets of the SDGs (roughly 40 per cent are the same). It also outlines the City Prosperity Index, which has global indicators, and uses those indicators. The data sources for the NUA rely on official national, subnational and local data sources and other sources where applicable. The baseline for the use of indicators is 2016, which is when the NUA was adopted.

35. There are six overall categories, three of which are transformative commitments and three of which cover effective implementation, which are further divided into subcategories.

[23] https://wedocs.unep.org/bitstream/handle/20.500.11822/32438/MPGE.pdf?sequence=1&isAllowed=y

[24] NUA Monitoring Framework and related indicators at: https://unhabitat.org/sites/default/files/2020/10/nua-monitoring-framework-and-related-indicators_1.pdf.

[25] https://unhabitat.org/guidelines-for-reporting-on-the-implementation-of-the-new-urban-agenda

The relationships between themes, categories and indicators are as follows: all indicators relating to a theme fall under the same category, so category 1.1 on sustainable urban development for social inclusion and ending poverty has several themes, such as 1.1.1. on social inclusion and ending poverty, which then has four subcategories, such as 1.1.1.1 on eradicating poverty in all its forms. Each of the subcategories has one or two indicators attached to it in order to minimize the reporting requirements for cities and governments. Examples of specific indicators include the percentage of cities with multi-hazard mapping, the existence of an enforced coastal land and/or land management plan in the country, and the green area per capita (also an indicator in the City Prosperity Index). There is a 1–2 page metadata sheet in the annex for each indicator which details the data required, what is being measured and how the required data should be calculated. Given that the tool is a tracking tool, it does not propose or include forward-looking indicators but rather aims to assist cities and governments in monitoring how they are progressing in implementing the NUA and, although not directly tied to climate change, it could be more relevant in the context of the GST, in particular if reinterpreted in the light of climate change.

(c) Green Future Index 2022

36. The Green Future Index[26] of the MIT Technology Review assesses national and global trends in transitioning into more green and sustainable economies. It ranks 76 nations and territories according to their current state and capacity to transition towards sustainable, low-carbon future and comprises five sections, namely overall ranking, carbon emissions (e.g. total carbon dioxide emissions per country as well as globally), energy transition (e.g. growth of renewable energy production), green society (e.g. percentage of solid waste recycled), clean innovation (e.g. growth in green intellectual property) and climate policy (e.g. carbon financing initiatives and sustainable agriculture policy). The index aggregates trends from the national level but also offers sector- and region-specific aggregation of trends. The time frame only includes the present day, as the index seeks to provide a current state of knowledge on green transition trends at the national, regional, sectoral and global level. Currently, the index does not explicitly focus on climate adaptation, even if many of the policies and trends are relevant for and could be made more specific to climate change adaptation.

(d) Convention on Biological Diversity

37. As the Adaptation Committee technical paper 2021[27] noted, the process under CBD is a good example, from one of the other Rio conventions, of how objectives can be set and progress measured. In 2010, the CBD identified the Aichi Biodiversity Targets, which comprise focal areas, goals, targets and indicators for 2011–2020.[28] The focal areas include reducing the rate of loss of biodiversity, promoting sustainable use of biodiversity, protecting traditional knowledge, and ensuring the fair and equitable sharing of genetic resources. Building on these focal areas, the CBD set goals and targets. For example, under the focal area of reducing biodiversity loss, one of the goals is to promote conservation and one of the targets is for at least 10 per cent of the world's ecological resources to be protected. It is worth noting that most of the CBD targets are qualitative, not quantitative. The CBD is currently in the process of negotiating updates to the Aichi Biodiversity Targets. Using a theory of change that would stabilize adverse trends by 2030 so that the goals of the Convention could be met by 2050, draft text proposes a set of goals for 2050, and milestones and action targets for 2030. For example, the goal of enhancing ecosystem integrity by 2040 would be partially accomplished through a number of milestones and action targets, such as a milestone of a net gain in area, connectivity and integrity of natural systems of at least 5 per cent, and an action target of restoring at least 20 per cent of degraded freshwater marine and terrestrial ecosystems.[29]

[26] https://www.technologyreview.com/2022/03/24/1048253/the-green-future-index-2022/.

[27] UNFCCC. 2021. *Approaches to reviewing the overall progress made in achieving the global goal on adaptation: Technical Paper by the Adaptation Committee.*

[28] https://www.cbd.int/sp/targets/.

[29] CBD/WG2020/3/3

38. These new CBD goals are tied to SDG goals, and the draft CBD report notes that achievement of SDG goals will also help create conditions to help meet its own goals. The proposed CBD goals would enhance the capacity of natural ecosystems to adapt to climate change.

2. Reports and studies providing insight into measurement of progress on the global goal on adaptation

(i) Disaster information management system of the United Nations Office for Disaster Risk Reduction[30]

39. DesInventar, the disaster information management system of UNDRR, has been recording information on the consequences of disasters worldwide for almost three decades. The system collects data on the human and socioeconomic consequences of events of all dimensions and magnitude at national and local levels and is used by 110 Member States of the United Nations. This data set has the advantage of being developed in a bottom-up manner and being developed, tested and scaled-up over time. In addition, the system's ability to disaggregate disasters at a relatively small geographic scale is a vital feature. As a result, the DesInventar database can provide information to help track progress on targets A–D of the Sendai Framework regarding the number of deaths and people affected by disasters, economic losses and any impacts on infrastructure. UNDRR is currently reconfiguring the system to align better with weather and climate observations, so it can release more user-friendly customized outputs, in partnership with UNDP and the World Meteorological Organization.

(ii) Damage and loss assessment methodology of the Food and Agriculture Organization of the United Nations

40. The FAO damage and loss assessment methodology[31] has been applied to monitor the Sendai Framework indicator on direct agricultural loss from disasters, which accounts separately for losses and damages to crops, livestock, forestry, aquaculture and fisheries.

41. The methodology distinguishes between damage, defined as complete or partial destruction of physical assets, and loss, defined as changes in economic flows resulting from a disaster. For example, loss of seeds or or damage to machinery would be considered as damage.

42. The method employs a global standard as to how damage and loss are measured for each sector and subsector. The method is used by countries at the national and subnational level and can draw on statistical offices, disaster risk reduction agencies, and ministries of agriculture, livestock, forestry and fisheries.[32]

43. The approach could be applied to other Sendai Framework indicators of loss owing to disasters, including losses in the housing sector, critical infrastructure and cultural heritage.

(iii) Rio Markers for Climate of the Development Assistance Committee of the Organisation for Economic Co-operation and Development

44. The OECD DAC Rio Markers for Climate[33] were developed to help track and assess how development assistance from OECD countries contributes to achievement of goals under

[30] https://www.desinventar.net/.

[31] FAO. Undated. "FAO's Damage and Loss Assessment Methodology to Monitor the Sendai Framework's Indicator C2 and the Enhanced Transparency Framework (ETF)." https://www.fao.org/documents/card/en/c/CB4265EN/.

[32] Details on the FAO methodology are provided in Conforti P, Markova G and Tochkov D. 2020. *FAO's methodology for damage and loss assessment in agriculture. FAO Statistics Working Paper 19-17*. Rome: FAO. Available at https://doi.org/10.4060/ca6990en.

[33] OECD DAC Rio Markers for Climate at: https://www.oecd.org/dac/environment-development/Revised%20climate%20marker%20handbook_FINAL.pdf.

the Rio conventions. This particular approach applies to mitigation and adaptation under the UNFCCC.

45. The OECD recommends taking a three-step approach to addressing adaptation:

(a) Demonstrating that climate change and variability causes risks, impacts and vulnerabilities;

(b) Stating that the intent of a project is to address the vulnerability to climate risks;

(c) Demonstrating that the project is or can reduce current or future vulnerabilities.

46. Projects are scored as either 0, 1 or 2 to reflect the role climate has in the development of the project:

(a) A project receives a score of 2 if it is considered to be principal, meaning that climate change adaptation is stated to be fundamental in the design or motivation for it;

(b) A project receives a score of 1 if it is considered to be significant, meaning that climate change adaptation is clearly stated but is not the fundamental driver of the project. An example of such a project is a "win-win" adaptation that has multiple motivations and could be justified without consideration of climate change;

(c) A project receives a score of 0 when climate change is not part of its objective.

47. This approach could be used to score adaptation measures identified (e.g. in NAPs) or implemented by any Government as part of the GST.

(iv) Operational framework for Tracking Adaptation and Measuring Development of the International Institute for Environment and Development[34]

48. This framework presents an overview of processes and steps that can be used in monitoring climate change adaptations. The approach of tracking adaptation and measuring development is designed for use by national and subnational governments, development agencies and non-governmental organizations. It assesses the effect of outputs (goods and services provided by adaptation interventions) on outcomes (short-term) and impacts (longer term). The guidance explains where the approach can be applied, how to develop a theory of change, how to develop indicators, how to use indicators and how to ensure that the interpretation of results includes consideration of attribution (i.e. ensuring that outcomes are attributable to inputs and outputs) and aggregation. The framework provides a twin-track approach that specifically examines climate risk management (track 1) with a focus on institutions, policies and capacities, and adaptation and development performance (track 2). For track 2, focus is on improving resilience and adaptive capacity, and reducing vulnerability, with resilience indicators (level 1) and well-being indicators (level 2). The scales used in tracking adaptation and measuring development can vary from local to global and can cover a range of timescales.

(v) Work by the Food and Agriculture Organization of the United Nations and the United Nations Development Programme on monitoring and evaluation in agriculture

49. One of the critical challenges in measuring the effectiveness of adaptation is being able to identify and quantify the relationship between outputs (e.g. policies or changes in behaviour) and outcomes. FAO and UNDP have in recent years worked on monitoring and evaluation in the agriculture sector in order to tie inputs and outputs in the sector to outcomes such as crop productivity and food security. A joint FAO and UNDP report[35] provides guidance on applying monitoring and evaluation to agriculture and tying it to NAPs. The approach has been applied in several developing countries. For example, in Colombia,[36] 24

[34] IIED, An operational framework for Tracking Adaptation and Measuring Development (TAMD) at: https://pubs.iied.org/sites/default/files/pdfs/migrate/10038IIED.pdf.

[35] FAO and UNDP. 2019. *Strengthening monitoring and evaluation for adaptation planning in the agriculture sectors.* Rome.

[36] FAO and UNDP. 2022. *Colombia: advancing monitoring and evaluation of adaptation in the agriculture sector.* Rome.

indicators of hazard, sensitivity and adaptive capacity were identified for agriculture. The report also identified 15 indicators for water resources and 21 indicators for biodiversity. A similar process in Guatemala[37] identified 102 indicators for the agriculture sector alone.

50. Although the FAO–UNDP approach is promising, it also demonstrates the complexity of linking output to outcomes in just one sector. Two different countries in Latin America developed bottom-up systems that yielded detailed but different sets of indicators. This demonstrates that it is possible to measure progress in a sector at a national scale, but whether results can be aggregated to the global level may depend on whether common indicators or metrics can be developed.

(vi) Climate change adaptation governance assessment framework of Climate Planning

51. The climate change adaptation governance assessment framework of Climate Planning[38] links data analytics with climate change adaptation governance to develop a baseline assessment as to how organizations such as cities and local governments are mainstreaming climate adaptation into their decision-making processes and mechanisms. In Australia, the methodology has been used to assess 360 local governments and several state governments and departments, and the private sector. The framework methodology uses both a quantitative assessment (analysis of corporate strategies and plans, and of staff surveys on understanding of climate change, departmental perceived capacity to adapt and barriers and enablers to improved consideration of climate change in decision-making) and a qualitative assessment (face-to-face meetings with key local government staff) that are further complimented by vulnerability and climate risk assessments.

52. In the quantitative assessment, 10 indicators are used to track adaptation governance, namely (1) strategic planning (e.g. how is climate change considered), (2) financial management (climate change recognized in financial planning), (3) public risk disclosure, (4) asset management, (5) land-use planning, (6) emergency management, (7) greenhouse gas emission reduction, (8) risk management, (9) adaptation planning and (10) climate change policy. All the indicators are ranked on a scale of 0–4, where 0 indicates "no data" or "none" and 4 is "advanced". An advanced score indicates that climate change is considered fully in the indicator area and includes responses to direct and indirect climate impacts. The quantitative assessment shows the extent to which an organization has embedded climate change adaptation into their policies, plans and decision-making processes that drive organizational decision-making, or are reporting on how effective these plans are. It also uses an additional seven indicators that are assessed through qualitative analysis: (1) climate risk assessments, (2) climate legal risk, (3) staff capacity and resource allocation for adaptation, (4) community or stakeholder engagement, (5) institutional or intergovernmental relationships, (6) climate change information and (7) information systems.

53. All the indicators used in the methodology are relevant to climate change adaptation and include a link to mitigation at the local government level. While the methodology allows the use of both quantitative and qualitative indicators, it could also be complemented by setting a future vision that would make the indicators forward-looking. For example, a local government could set a vision to be well-adapted (scoring 4) by 2040 across specific indicators where it is currently not performing well and then use the tool to work out the areas in which it needs to improve and put in place strategies in reaching the vision.

[37] FAO and UNDP. 2020. *Guatemala's progress in developing a national monitoring and evaluation system for adaptation in the agriculture sector*. Rome.

[38] https://www.unley.sa.gov.au/files/assets/public/environment-hub/climate-change-adaptation-governance-assessment-report-for-unley-29-06-21.pdf.

3. Examples from other sectors on forward-looking approaches

(a) Future-back thinking[39]

54. Future-back thinking is an approach that could be useful when considering leading indicators (forward-looking) and how those could strengthen the approach taken to operationalize the GGA. Future-back thinking[40] has been developed at Harvard Business School and is an approach that combines qualitative and quantitative data in setting future goals and scenarios (Johnson and Suskewicz, 2020). The approach aims to enable organizations to develop future scenarios and possibilities by building a new vision that can be implemented. Most future-oriented thinking suffers from cognitive biases such as "normalcy bias" where it is expected that the future will be only slightly different from the past. This approach, however, seeks to ask bold questions and tease out assumptions that different members within an organization might hold about how the future is likely to unfold.

55. The approach aims to converge on a core set of assumptions about the future that can help to drive a data-gathering process in identifying indicators that can be used to "backcast" the necessary actions and strategies. The time frames are often 5–10 years to allow consideration of the future and to move away from the present. The approach focuses on building "view of the future" statements that clearly articulate future scenarios. These are often substantiated by more detailed research into potential trends that affect and play a large part in making those future situations a reality. Questions that could be helpful for consideration of the GGA include:

(a) What would need to be believed regarding the future state of the world in order to achieve the GGA;

(b) What are the major assumptions about the future state of the world;

(c) Will future generations define resilience and adaptation differently from current generations? What could those definitions be?

(a) Four-tier approach to the global goal on adaptation

56. Another approach discussed during the informal launching of the GGA work programme event[41] included four different thresholds of action and ambition for the outcome of adaptation – this type of forward-looking goal setting could provide collective yet subjective self-assessment for countries to set their adaptation goals and ambitions. :

(a) Level 1 would be the survival threshold. The goal would be to ensure the minimal level of resilience for survival. It could take the form of a minimum quantity of fresh water or calories per capita, below which people's lives and livelihoods would be untenable;

(b) Level 2 would be the stabilization threshold. The goal would be to undo the net harm from climate change in a way that preserves the status quo and level of development of a country, society or community. This would take the form of offsetting the negative effects of climate change through adaptation measures that would ensure that the country remains at the same level of well-being that it would have enjoyed without climate change;

(c) Level 3 would be the SDG threshold. The goal would be to ensure that resilience action and outcomes are sufficient to maintain the SDGs beyond 2030, even in the presence of the impacts of climate change which threaten to reverse that progress.

(d) Level 4 would be the transformation threshold. The goal would be to ensure that, in spite of climate change and in addition to achieving minimal resilience standards and offsetting all climate change impacts, and SDG retention, the goal would ensure that a country, society or community would also be able to attain its aspirational future

[39] Available at https://www.innosight.com/insight/a-future-back-approach-to-creating-your-growth-strategy/.

[40] Johnson M W and Suskewicz J. 2020. *Lead from the future: How to turn visionary thinking into breakthrough growth.* Boston, MA: Harvard Business Review Press, p. 237.

[41] As announced during the closing plenary of COP 26, the informal event "Launching the Glasgow–Sharm el-Sheikh work programme on the global goal on adaptation" was hosted by the Government of Maldives on 16 and 17 May 2022.

developmental state. For example, if a country's aspiration is to ensure an 11 per cent growth rate per annum, or to move from the status of a least developed country to that of a middle-income country by a certain year, or to transform from a primary economy to a tertiary economy, or to reach a specific level of digitization and use of frontier technologies, it would be able to attain this under this high-ambition GGA.

57. A country might, however, not just focus on a single goal and threshold. For example, for some countries, such as small island nations, their most immediate concern and goal is survival (level 1) but they can also aspire for the transformation threshold (level 4) in doing so. This type of layering approach therefore does not mean that countries have to choose a single level but can determine which levels best align with goals and thereby assess which level or levels they are aiming for in their ambitions. Using this approach can help countries look beyond climate change responses which mainly focus on moderating harm, and instead ask fundamental questions regarding how a country, and the global community as a whole, can move to a different developmental future from the current state. This approach can lead to new discussions on transformation, and how adaptation can assist countries in reaching their full potential.

(b) Mujib Climate Prosperity Plan: Decade 2030 under the Vulnerable Twenty Group of Ministers of Finance of the Climate Vulnerable Forum

58. One of the climate prosperity plans under the V20 is the Mujib Climate Prosperity Plan,[42] which outlines how Bangladesh aims to achieve climate resilience despite the increasing climate change impacts in the future. Its main principles focus on increases in growth by maximizing resilience with loss and damage financing, with the aim of achieving high upper middle-income status within a single decade; increasing employment in a green economy in alignment with climate-resilient, low-carbon, resource efficient, gender-responsive and socially inclusive principles; blending twenty-first century technologies with sustainable and traditional lifestyle practices and living to promote well-being; and securing resilience, energy independence and energy security, including by becoming a net green energy exporter. The plan will be achieved through national planning processes and the SDGs, with the expectation of reaching approximately USD 80 billion in investments over the next decade. The plan also relies on harnessing the Accelerated Financing Mechanism and Sustainable Insurance Facility of the V20 and is supported by Bangladesh's Eighth Five Year Plan (2021–2025), Vision 2041, the Bangladesh Delta Plan 2100, NAP and NDC. The Mujib Climate Prosperity Plan focuses on shifting to a new risk management paradigm and changing the country's trajectory from vulnerability to resilience and then to prosperity, and includes perspectives up to 2050 in alignment with the Climate Vulnerable Forum and the Paris Agreement.

59. The Plan also relies on a new financing paradigm that is founded on valuing poverty reduction, modernized job opportunities, improved trade and macroeconomic stability supported by climate risk governance. The Plan has 12 specific socioeconomic outcomes expected by 2030, including the elimination of extreme poverty, 4.1 million new climate-resilient jobs and unemployment reduced to 3.9 per cent. This plan explicitly outlines several goals that extend beyond 2030, combines several key plans and strategies that cross national borders, for example through the V20 and Climate Vulnerable Forum, and outlines the opportunities in shifting to a new paradigm in economic sectors and for well-being. The approach could provide new insights for the GGA and shift the current discussions from "business as usual" to a more aspirational and goal-oriented approach. It is largely consistent with "Level 4" threshold under the four-tier approach described in section 3 (b) above.

[42] Mujib climate prosperity plan, decade 2020, at: https://mujibplan.com/wp-content/uploads/2021/12/Mujib-Climate-Prosperity-Plan_ao-21Dec2021_small.pdf.

(c) Catalogue of forward-looking indicators from selected sources. A contribution to the forward-looking component of a shared environmental information system of the European Environment Agency.

60. This indicator report from the European Environment Agency[43] uses forward-looking indicators that combine different sets of information, are often model-based, and answer a set of policy questions. Each indicator falls under a theme, so, for example, the indicator for "total fertilizer consumption – outlook from FAO" falls under agriculture. Information on each indicator comprises definition (what the indicator covers), the model used, ownership (who owns the data set), temporal coverage (years covered) and geographical coverage (the areas for which data exist). Two policy questions are outlined for each indicator that guide the analysis of trends, for example "are fertilizers being used in a more efficient/sustainable way?" and "has the environmental impact of agriculture been reduced?" There is also a summary information sheet for each indicator that outlines different policy contexts, such as the pan-European, EU (relevant directives and regulation) and subregional policy contexts. The information sheet provides specific details on the model used for indicator calculation, including a detailed explanation of the assumptions built into the model used to forecast the trends (both past and future). It also includes data specifications (input data for the model) and outlines the three types of uncertainty that need to be taken into considerations when interpreting the results, namely that related to the model, to data uncertainty and to uncertainty for indicator calculations. The indicator list also includes climate change related indicators, but these mostly relate to emissions, sea level rise and temperature rather than to adaptive capacity, resilience or vulnerability reduction.

61. The approach offers the consideration of policy-relevant questions through a global analysis (where applicable) while also specifying the policy context at different levels and the different plans and directives that have an impact on a particular indicator. It also provides sufficient detail to understand the main assumptions that have been built into the model that is the main source of analysis (e.g. the FAO model in the case of fertilizer consumption). This approach could therefore be useful, given that it looks at both past and future trends, seeks to aggregate data at the global level through a regional approach, and has clear questions that need to be answered under each indicator. In the context of the GGA, this could take the form of asking, for example, "has adaptive capacity been increased?", which would require the more specific policy contexts to be outlined at different levels, and the identification of suitable data sets for analysing trends, such as the possible provision of data on adaptive capacity needs and associated finance or projects over time from countries reports submitted to the UNFCCC or climate fund projects and programmes.

III. Discussion

62. This paper has examined, as mandated by SB 56, a range of indictors, approaches, targets and metrics that are currently in use by different entities for a variety of purposes. It has provided a wide range of examples that Parties have highlighted in previous deliberations on the GGA and has built upon the 2021 technical paper by the Adaptation Committee by including more detailed analysis of indicator components and time frames used. This analysis has added value through its focus on target setting and by considering forward-looking indicators, which is consistent with the mandate of the GGA and its interlinkages with the GST.

63. Many of the indicators, targets and metrics are focused on the short term and aim to assess current baselines and performance compared with the past rather than setting longer term goals and ambition for climate adaptation. Some, such as the climate adaptation governance methodology, do, however, specifically note how indicators can be either quantitative or qualitative in nature and offer combinations of methodologies where both kinds of indicator are used to develop a more holistic approach to managing climate risks.

64. Some indicator approaches, such as that of the European Environment Agency, focus on asking policy-relevant and guiding questions that enable a more forward-looking approach

[43] https://www.eea.europa.eu/publications/technical_report_2008_8.

in data gathering and projecting indicators into the future. Future-back thinking offers a similar question but also a vision-based approach where the focus is foremost on the goal and vision of the future that is further explored through key questions that stakeholders are invited to consider and answer before outlining how the vision can be reached and which strategies are put in place. The V20 Climate Prosperity Plans offer an alternative approach that sets a vision of future prosperity with forward-looking indicators that is starting to shift some of the current thinking and paradigms into a model that focuses on overall well-being at the country level.

65. There are a number of other approaches that take a different view on the time frame under consideration and the nature of ambition on transformative change and transformation in the future. For example, the "burning embers" approach of the IPCC could provide a qualitative yet data-backed approach for estimating risk levels and the different levels of adaptation that countries face. More deliberations into goal setting and exploring the deeper fundamental assumptions about the future, such as considering the four-tier approach to the GGA, could also provide a chance for finding common ground and shared ambition as to what constitutes a well-adapted global community. The four-tier approach could include several levels with their own indicators that could also link to other globally set targets (see table below). Further unpacking these four different tiers at the global, regional, national and local level could provide an opportunity to identify which indicators best work at which level, and how they could contribute collectively to progress on the GGA.

Table
Four-tier global goal on adaptation and geographic scale

Threshold and descriptor	*Global*	*Regional*	*National*	*Local*
Survival – basic needs are safeguarded	By 2030, achieve universal and equitable access to safe and affordable drinking water for all (SDG 6.1) Reduce direct disaster economic loss in relation to global gross domestic product by 2030 (Sendai Framework global target C)		By 2030, 6 million people (70 per cent of population) benefit from improved multi-hazard early warning information to respond to climate extremes (Papua New Guinea, NDC) Average damages for each flood event are reduced by 5 per cent for each subsequent period of five years (Albania, NAP) To have relocated, by 2025, between 3,500 and 6,000 of the households in flood or contaminated zones (Uruguay, NDC)	Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020 (Sendai Framework global target E)
The stabilization threshold – where the impacts of climate change are offset	Restoration of 15 percent of degraded ecosystems by 2020 (CBD, Aichi Target 15)		As of 2025, the Guatemalan Reef Health Index (ISA) remains at the same level as the 2020 baseline (Guatemala, NDC)	75% infrastructure projects in community and indigenous territories designed and built based on risk assessment, including climate-related threats (Costa Rica, NAP)
SDG – the SDGs are attained and retained for the long term, even in the presence of climate change		By 2030, increase the economic benefits to small island developing States and least developed countries from the	As of 2025, the Guatemalan Reef Health Index remains at the same level as	

	sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism (SDG 14.7)	the 2020 baseline (Guatemala, NDC) Develop and implement an in situ programme for monitoring biodiversity in terrestrial ecosystems in 40 conservation units covering different biomes, and in 10 conservation units located in coastal marine ecosystems, with emphasis on critical ecosystems such as coral reefs and mangroves (Brazil, NAP)	
Transformation – transformational aspirations of countries towards attaining scaled-up levels of sustainability and resilience are achieved, even in a climate-changed world	Develop alternative livelihood programmes with forest-dependent people in five forested counties to ensure a just transition from forest extractive models for local communities, including development of models and markets for non-timber forest products and for sustainable ecotourism by 2030 (Liberia, NDC)	An estimated 700,000 homes will be built with alternative bioconstruction systems (wood, bamboo and bahareque), in response to loss and damage owing to adverse effects of climate change, and special attention to rural areas, indigenous peoples and other ecologically fragile areas. (Venezuela, NDC) Eradicate waterborne diseases (South Sudan, NDC)	By 2022, skills have been developed and knowledge provided to transform municipal planning with a vision of adaptation and climate risks in 20 municipalities of the country (Costa Rica, NDC)

Note: Adapted from discussions during SB 56 and the first workshop on "Enhancing understanding of the global goal on adaptation and reviewing progress towards it".

66. There has been progress in setting goals and targets relating to other development and environmental challenges, all of which interact with climate change. For example, the SDGs set goals for development; the Sendai Framework sets goals for disaster risk reduction; and the CBD sets goals and targets for protecting the planet's biodiversity. The challenge for the GGA may be to set similar goals and targets but also extend them to other sectors affected by climate change, such as coastal resources, human health, agriculture and water resources. Importantly, the GGA can set a bold and ambitious vision that provides goal setting and direction for the global community in the overall progress in adapting to climate change.

67. Such considerations may be consistent with the goals under Article 2 of the UNFCCC of allowing ecosystems to adapt naturally to climate change, ensuring that food production is not threatened, and enabling economic development to proceed in a sustainable manner. While these outcomes are intended to define greenhouse gas stabilization targets, they can also be used to define adaptation goals and targets.

68. In addition, as was mentioned by many Parties at the first workshop on "Enhancing understanding of the global goal on adaptation and reviewing progress towards it"[44], when considering matters related to reviewing the GGA,[45] it is important to consider indicators and metrics that can contribute to reviewing the progress towards achieving the GGA, with a view to informing the GST.

69. In the context of forward-looking indicators and vision-based approaches, key questions to consider, including at the upcoming third workshop[46] under the Glasgow–Sharm el-Sheikh work programme, on methodologies, indicators, data and metrics, monitoring and evaluation, could include:

(a) What are the characteristics of a resilient and well-adapted country and global community;

(b) What will indicate that the GGA has been achieved;

(c) How can indicators, targets and metrics be identified to enable a self-assessment process that also takes account of differences in national circumstances;

(d) What would need to be believed regarding the future state of the world in order to achieve the GGA? What are the major assumptions about the future state of the world;

(e) How can adaptation ambition be increased, for example by using the four-tiered approach?

[44] https://unfccc.int/documents/576074.

[45] Paris Agreement, Article 7, para. 14(d) and decision 7/CMA.3, para. 7(c).

[46] https://unfccc.int/topics/adaptation-and-resilience/workstreams/glasgow-sharm-el-sheikh-WP-GGGA

Annex

Compilation of indicators, approaches, targets and metrics that could be relevant for reviewing overall progress made in achieving the global goal on adaptation

Table
Compilation of relevant indicators, approaches, targets and metrics

Resource	*Focus*	*Scale*	*Aggregation*	*Data/information source*	*Time frame*
SDG indicator framework and SDG tier classification approach; UNEP SDG monitoring methodologies	Disaster impacts on mortality and property. A total of 23 indicators directly or indirectly tied to climate change	National	Financial damages can be aggregated. Health risks can be combined if weighted by population	National reporting data. Sources can vary from satellite data to sensors to crowdsourcing	By 2030
Sendai Framework global indicators	A total of seven global targets with 38 global indicators tied to the SDGs	Substantial reductions by 2030	Aggregation from national reporting tools and data	Progress measured through available databases, such as the Disaster Loss Accounting System, on the basis of national reporting tools and data	By 2030
UNEP adaptation gap reports	Measure implementation and financing of adaptation, including tracking adaptation institutions, finance, and projects	National	Can aggregate finance and number of projects	Use national and UNFCCC data	Current state of action
Feasibility framework of Working Group II of the IPCC	Assesses feasibility of adaptation options under different temperature levels	Global and regional	Can aggregate trends	Uses global and regional literature as well as elicitation of expert views to assess feasibility and effectiveness	Time frame often temperature scenario related
Adaptation Fund results tracker	Contains project-based goals and outcomes	National measures and project-based	Can aggregate by counting projects, finance costs or number of nations with projects	National and international data	
European Commission horizontal assessment scoreboard	Uses a range of metrics and indicators to assess level of adaptation; eight actions with multiple objectives	National	Can aggregate to regional (EU) level; can consider transboundary	National data	Current state of action
Race to Resilience Metrics Framework	Aims to build the resilience of 4 billion people in	Initiative-based (from pledges)	Can aggregate overall numbers across initiatives	Initiative- and project-based data	2030

Compilation and synthesis of indicators, approaches, targets and metrics for reviewing overall progress in achieving the global goal on adaptation

Resource	*Focus*	*Scale*	*Aggregation*	*Data/information source*	*Time frame*
	vulnerable communities				
United Nations early warning systems	Install early warning systems across the world	Global	Number of countries with early warning systems	National data	within the next five years
World Bank Resilience Rating System	Rate resilience of projects (for project + beyond projects)	Project-based	Three categories for rating the level of resilience incorporated in, for example, project design	Project documents	Depends on project
Measuring Progress Towards an Inclusive Green Economy (UNEP report)	Measures human and natural capital and environmental goods and services. Contains specific measures on water resources, forests and conservation areas	National	Can aggregate absolute measures with a common metric	International and national data sources. Data will need to be made comparable	Reports current conditions so can track progress towards green growth, not projections
NUA Monitoring Framework	Tracking tool to monitor implementation of NUA using 77 indicators	National and city	Aggregates from cities and different levels	Official national, subnational and local data sources, and other sources where applicable	Using 2016 as the baseline year for a majority of the indicators
Green Future Index 2022	Assesses national and global trends in transitioning to greener economies; five sections with country rankings	National, regional, sectoral and global	Aggregates trends from national level but also offers sector- and region-specific aggregation of trends	Various data sets	Present-day assessment
CBD	Contains focal areas, such as reducing biodiversity loss, goals, targets and indicators; mostly qualitative targets	Global	Could be disaggregated to national level	Government and non-government data sources tracking species abundance and habitats	Based on observations but can include forward-looking goals and targets.
Aichi Biodiversity Targets	A total of 20 indicators, both generic and specific	Global	Both generic (global) and aggregation of national data	Range of data sources; specific indicators have seven categories for ranking	2015 or 2020
DesInventar	Contains decades of observations in about 80 countries on consequences of small, medium, and large disasters	National	National results can be aggregated	A total of 65 data sets in 82 countries	Observations from 1980s to the present day. Does not project future impacts
The OECD DAC Rio Markers	Score adaptation based on extent to which driven by	Project	Scores can be aggregated	Scoring is based on judgment as to the role climate	Can be applied to projects

Compilation and synthesis of indicators, approaches, targets and metrics for reviewing overall progress in achieving the global goal on adaptation

Resource	*Focus*	*Scale*	*Aggregation*	*Data/information source*	*Time frame*
	climate change. Principal project exists because of climate change; significant has climate change role but could exist without it. 0 score has not CC influence			change has in justifying the project	addressing current or future risks
Operational framework for Tracking Adaptation and Measuring Development of the International Institute for Environment and Development	Measures effect of adaptations on short-term outcomes and long-term impacts. Nine indicators for institutions, policies and capacities as well as Resilience and well-being indicators	Primarily national, but can be subnational, regional and global	Not clear if national data can be aggregated. May be able to aggregate qualitative results	Uses national and subnational data	Can measure observed progress but can also be used to project effects of adaptations
FAO–UNDP work on monitoring and evaluation	Used for monitoring and evaluation of agriculture in several countries. Helps develop country-specific indicators	National	Common indicators and metrics would be needed to allow for aggregation. Method could be applied to other sectors	National and local data	Has focused on observed monitoring and evaluation. Could be forward-looking
Climate change adaptation governance assessment framework of Climate Planning	Assesses adaptation governance at local and state level; 10 quantitative and 7 qualitative indicators	Local, state and regional government (but works at organizational level)	Aggregates data at organizational level but can aggregate data, for example, from all local governments for broader trends	Data drawn from publicly available documentation and science, staff surveys and interviews	Provides a baseline but can also be used to set adaptation goals for future to be tracked
Future-back thinking	Envisages a desirable future world through backcasting technique	Organizational, but could be used at other levels	Can aggregate both quantitative and qualitative data	Data sources from multiple sources to depict potential future trends	5–10 years in the future (minimum)
Four-tier approach to the GGA	Sets adaptation ambition for the future	Global and national	Could aggregate	Both quantitative and qualitative sources	2030 and beyond
V20 Climate Prosperity Plans	Shifts to a new risk management paradigm; focuses moving from vulnerability to resilience and then to prosperity	National		National data and future trends	Varies depending on the action and includes 2030, 2041 and 2100

Compilation and synthesis of indicators, approaches, targets and metrics for reviewing overall progress in achieving the global goal on adaptation

Resource	*Focus*	*Scale*	*Aggregation*	*Data/information source*	*Time frame*
European Environment Agency catalogue of forward-looking indicators from selected sources	Forward-looking indicators across range of sectors	Issue-specific but country-level analysis	Can aggregate across sectors and at national level	Data sources outlined under each indicator and related summary information sheet	Past, present and future

Abbreviations and acronyms

CBD	Convention on Biological Diversity
COP	Conference of the Parties
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GGA	global goal on adaptation
Glasgow–Sharm el-Sheikh work programme	Glasgow–Sharm el-Sheikh work programme on the global goal on adaptation
GST	global stocktake
IPCC	Intergovernmental Panel on Climate Change
NAP	national adaptation plan
NAPA	national adaptation programme of action
NDC	nationally determined contribution
NUA	New Urban Agenda
OECD	Organisation for Economic Co-operation and Development
SB	sessions of the subsidiary bodies
SDG	Sustainable Development Goal
Sendai Framework	Sendai Framework for Disaster Risk Reduction 2015–2030
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environment Programme
V20	Vulnerable Twenty Group of Ministers of Finance of the Climate Vulnerable Forum