

NEW REALITY, OLD INSTITUTES

International Organisations Research Journal, 2023, vol. 18, no 2, pp. 31–52

Original article

doi:10.17323/1996-7845-2023-02-02

Strengthening G20 Support for the UN's Sustainable Development Goal 13 on Climate Change¹

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Abstract

Climate change, biodiversity loss and human-generated pollution pose an urgent, existential threat to all living things. United Nations (UN) scientific reports, and several others, confirm humanity's destructive impact on the earth's atmosphere, land and water. They also confirm that climate change creates new problems and exacerbates existing social and economic problems across all the sustainable development goals (SDGs) in the UN's Agenda 2030 for Sustainable Development. Yet, in their design, the 17 SDGs and their 169 targets make very few explicit links between climate change, specifically, and the other ecological and socio-economic goals. And, on the few key indicators tracked by the Sustainable Development Index Dashboard under SDG 13 on climate change, the developed countries lag well behind developing ones, while progress on many SDGs has reversed since 2019. The Group of 20 (G20) developed and emerging economies, all systemically significant, comply with their own climate change goals at an average of just 69%. Given its membership profile and vast resources, the G20 has great potential to reinforce progress toward the SDGs. By improving its own performance on climate change, the G20 can help the UN and its members spur progress on SDG 13 on climate change, and thus on other closely related SDGs. The G20 leaders at their summits should therefore make far more ambitious commitments on climate change, explicitly link them to sustainable development, SDG 13, other socio-economic SDGs, and the UN's climate conference. They should also foster more synergies between the UN's SDG high level meetings, UN climate summits, and special climate summits and recognize in their G20 communiqués the climate-related, shock-activated vulnerabilities of, and their socio-economic impacts on, countries in and beyond the G20.

Keywords: G20, SDG 13, Climate Change, UN, SDG Targets

For citation: Kirton J., Warren B. (2023) Strengthening G20 Support for the UN's Sustainable Development Goal 13 on Climate Change. *International Organisations Research Journal*, vol. 18, no 2, pp. 31–52 (in English). doi:10.17323/1996-7845-2023-02-02

¹ This article was submitted 07.02.2023.

Introduction

Climate change, biodiversity loss and human-generated pollution pose an urgent, ultimately existential threat to humanity and other living things. The United Nations' (UN) Intergovernmental Panel on Climate Change's (IPCC) sixth assessment report, published on 4 April 2022 before the UN's climate conference in Sharm el-Sheikh in November 2022, emphasized that fossil fuels must be abandoned, that the livestock industry is one of the world's most polluting industries, that diets must change, and that cities must be re-organized and greened. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) 2019 Global Assessment Report on Biodiversity and Ecosystem Services emphasized the irreplaceability of key ecosystem services, the inequity and trade-offs in existing production structures, and that biodiversity is in rapid decline due to human activity. And the UN Environment Program's (UNEP) Emissions Gap Report, published on 27 October 2022, declared that "only an urgent system-wide transformation can avoid climate disaster" [UNEP, 2022].

Together, these reports codified and confirmed a scientific consensus that humanity's assault on the environment has reached a critical stage and that the efforts of the major global governance institutions to reduce or reverse that assault have failed. The UN Climate's 27th Conference of the Parties (COP 27) in Sharm El-Sheik in November 2022 created a still largely unfunded fund for the loss and damage suffered by poor countries and did virtually nothing to stop the proliferating greenhouse gas emissions and subsequent extreme weather events. UN Biodiversity's COP 15 in Montreal in December 2022 produced what was lauded by the UN as a landmark agreement to protect global biodiversity [UNEP, 2022]. The agreement included a goal to increase countries' protected land and marine areas from the current 17% to 30%, to phase out or reform subsidies that harm biodiversity by at least \$500 billion per year and to mobilize at least \$200 billion per year for biodiversity protection. Yet, this was still nowhere near enough to meet the ecological need. The Group of 20 (G20) summit in Bali, Indonesia on 15–16 November 2022 made 18 commitments on climate change and a record 24 on environmental domains beyond. But they were not sufficiently ambitious to turn the tide, even if all members fully complied with them.

This article thus addresses three critical, central questions. First, how, and how well, does the UN's sustainable development goal 13 on climate action link to the explicit component targets on climate change in all the other SDGs to enhance the ability of the 17 SDGs to meet the global need? Second, how well has the performance of G20 summits in their climate change conclusions, commitments, compliance, and synergistic links to other subjects helped advance climate action since their start in 2008 through to their Bali summit in November 2022? Third, can this G20's performance be strengthened by fostering more compliance with these voluntary, politically obligatory commitments and by more ambitious commitments themselves?

This article offers three answers. First, the UN SDGs seemed well designed, with SDG 13 dedicated to climate change and five of the other 17 SDGs explicitly devoted to other key ecological domains. But few of the other SDGs' component targets are explicitly linked to climate change. Moreover, the advances toward the climate-related goals and targets by the UN system and its members have largely been reversed or reduced since 2019 [Steiner, 2022]. G20 summits are required to remedy this situation.

Second, G20 summits have increasingly made commitments on climate change, but members' compliance with them has been poor, and G20 performance has fallen further behind the growing global need [Kirton, Kokotsis, Warren, 2022; Warren, 2022].

Third, and most importantly, solving the ecological threat of climate change requires ambitious, transformative action from the UN, the G20, and its members to rapidly reduce the

anthropogenic sources of greenhouse gas emissions into the atmosphere and expand the sinks that remove and store them. This action should start at and build on the UN's SDG summit and the G20's New Delhi summit in September 2023. To improve compliance, forthcoming G20 summits should include in their climate commitments more links to sustainable development, the 2030 Agenda, the other SDGs, the UN Framework Convention on Climate Change and its Conference of the Parties meetings. They should also foster more synergies between UN SDG summits, UN climate COP summits, and special climate summits and recognize in their G20 communiqués the climate shock-activated vulnerabilities of G20 members and others and their socio-economic impacts.

This article focuses specifically on the core concern with “climate change,” while acknowledging that almost all SDGs, targets, and indicators have substantial, if explicitly unrecognized, links to climate change in the material world. It further acknowledges that many SDGs, and the G20's performance on other subjects, also lag the politically designed and physically needed programme, while noting that comparative analysis, relevant causes such as the COVID-19 pandemic, military conflicts, and geopolitical tensions, and root causes such as capitalism and colonialism are beyond the scope of this analysis. It acknowledges, finally, that some still deny the fact, importance, and harmful impacts of climate change and its overwhelming human cause; however, this analysis relies on the best, most recent scientific evidence, codified in the consensus reports of the IPCC and others cited herein, as the scientific foundation on which to build a better political response from the global summit-level of the UN, and especially the wealthy G20, that is needed now.

The UN's Promising but Failing Sustainable Development Goals

To confront the accumulating climate change, biodiversity, and ecological crises, the UN SDGs, launched in 2015, seemed well designed. SDG 13 is dedicated to climate action and five of the other 17 goals are explicitly devoted to the other key environmental domains—those on life on land, life below water, clean water, clean energy, and sustainable cities (see Appendix A). While there are many interconnected links in the material world, few of these politically constructed goals and the other ones include “climate change” explicitly among their component targets. Moreover, since the COVID-19 outbreak in 2019, progress toward meeting the climate-related goals and targets has been reversed or reduced [Steiner, 2022]. And, on climate change, according to the four indicators monitored by the Sustainable Development Index Dashboard [n.d.], developed countries, especially those in the G20, lag the rest of the world.

The SDGs' Partially Promising Design

The SDGs, finalized and adopted at a UN summit in September 2015, contain 17 goals, with 169 targets plus indicators. In sharp contrast to the UN Millennium Development Goals launched in 2000, which had only one out of eight goals on the environment and none on climate change, the SDGs include SDG 13 on climate action, as well as SDG 6 on clean water and sanitation, SDG 7 on affordable and clean energy, SDG 11 on sustainable cities and communities, SDG 14 on life below water, and SDG 15 on life on land. Moreover, the SDGs were designed to cover all countries, developed and developing alike, and with each of the 17 mutually reinforcing goals directly supporting the achievement of all the others. They were, however, designed to support developing countries first, as seen in the funding related targets, such as those for climate finance.

Within each of the 17 SDGs, there is an average of 10 targets. But only three of the 16 goals beyond SDG 13, have a target explicitly on climate change, and these three goals have only one

climate target each (see Appendix B). SDG 1 on “end poverty” has reducing the poor’s “exposure and vulnerability to climate related extreme weather events.” SDG 2 on “end hunger” has maintaining “ecosystems in cities that strengthen capacity for adaptation to climate change.” SDG 11 on sustainable cities and communities has “adopting and implementing integrated policies and plans towards ...mitigation and adaptation to climate change.”

None of the other key environmental SDGs have an explicit climate reference. But, implicit references to directly related relationships appear. They include SDG 7 on affordable and clean energy with two targets on renewable energy; SDG 14 on life below water with a target on “ocean acidification;” and SDG 15 on life on land with several targets on forest protection and an important link between ecosystem health and poverty reduction. More broadly, SDG 12 on responsible consumption and production has a target to “rationalize inefficient fossil-fuel subsidies.”

The core SDG 13 on climate action has two targets that link climate change to other SDGs. Its SDG target 13.3 focuses on climate education and thus links to SDG 4 on quality education. SDG target 13.b aims to include women in climate-related planning and management and thus links to SDG 5 on gender equality.

Taken together, the combined portrait shows that climate change is not mainstreamed across the SDGs. This matters, given that climate change impacts all the 2030 Agenda goals and will continue to slow, stall, or reverse progress toward meeting the SDGs by their due date in 2030.

Partial and Reversing Progress on Implementing the SDGs

Progress toward meeting the SDGs’ climate-related goals and targets was partial but promising in the first five years following their launch; however, since 2019, it has reversed [Steiner, 2022].

To be sure, the SDGs’ sweeping and lofty goals are difficult to quantify, measure, and track as a whole given important data gaps [Bidarbakhtnia, 2022]. But the targets and indicators provide greater specificity and several institutions contribute to monitoring and assessing them. They include the Food and Agriculture Organization (tracking food-related targets), the UN (tracking regional progress, such as that in Asia), academic institutions (such as Cambridge University) tracking a range of targets, the European Commission (tracking the European Union’s (EU) progress), and the Sustainable Development Index Dashboard (tracking select indicators across all 17 SDGs).

The Organisation for Economic Co-operation and Development’s (OECD) recent report from April 2022 shows a mixed performance at best in advancing toward meeting the SDGs by the 2030 deadline. It shows that progress was hampered and reversed due to the proximate cause of the COVID-19 pandemic. It has been further stunted by another proximate cause—Russia’s war in Ukraine, particularly for the goals on food security, energy security, and wealth equality [Pereira et al., 2022]. War has adverse impacts on water infrastructure and quality, including in the marine environment, degrades terrestrial environments, raises emissions, and reduces the ability of the countries in conflict to prepare for climate-related disasters.

The OECD [2022] reports that no target under SDG 13 on climate change is close to being reached on time. The remaining key ecological SDGs have seen some progress but are also still far from being achieved. They include goals 6 on water, 14 on life below water, 15 on life on land, and, more broadly, 12 on sustainable consumption and production. A similar picture emerges for four other SDGs that the OECD considers environmental goals, and for all the remaining ones. All are reported to have, at best, a mixed outlook that is largely skewed toward a grand miss of the 2030 deadline to achieve them.

This conclusion is confirmed by the UN's own assessment. According to UN Stats [2022], there has been a deterioration of progress on reducing global emissions (SDG 13), on increasing fish stocks to sustainable levels, and on the protection and prevention of extinction for threatened species (SDG 15). There has been little to no progress on the sustainable use of terrestrial and mountain ecosystems (SDG 15) and, more broadly, on rationalizing inefficient fossil-fuel subsidies (SDG 12).

It is possible that countries could show and support more progress by taking a holistic approach that recognizes co-benefits, such as promoting nature, which also improves health [Robbins, 2020]. However, generally, the actual effectiveness of such global environmental regimes, to which the UN 2030 Agenda and its SDGs largely belong, is difficult to measure. Effectiveness, defined as a problem solved, runs into complications when there are varying ways of defining the problem. For example, G20 countries cannot agree what constitutes an "inefficient" fossil fuel subsidy [Young, 1999]. The voluntary nature of some global goals, and their non-legally binding nature, is a factor too, along with root causes of the problems such as linear infinite growth economic models and others. Even more difficult is estimating how much advances toward the key ecological SDGs have changed net greenhouse gas emissions and concentrations, covering both sources and sinks, in the immediate, short, and longer terms, amidst the many other causes of such changes.

An easier and adequate way to start is to measure first-order compliance, composed of governments' implementing actions [Daniels, 1993; Kokotsis, 1999]. Although this approach stops short of estimating whether a problem, defined or undefined, has been solved at all or by the actions of the actor under review, this approach provides valuable insight into the usefulness and contribution of a regime or individual institution.

The G20's Climate Change Goals

The G20 summits, started in 2008 and supplemented since 2017 by a new array of special, ecologically focused summits, have added many commitments in direct or contextual support of climate action and the SDGs [Kirton, Kokotsis, 2015; Kirton, Kokotsis, Warren, 2022; Warren 2022] (see Appendix C). But these G20 commitments often lack ambition, specificity, and multi-subject synergies for broader co-benefits. Moreover, compliance has been poor, causing G20 performance on climate change, sustainable development, and the SDGs to fall further behind in meeting the growing global need.

Conclusions

Since their 2008 start, G20 leaders at each of their regular summits have dedicated an average of 5% of their public communiqués explicitly to the subject of climate change [Warren, 2022]. This is much lower than the 32% average for the G20's all-time top-ranked subject of macro-economic policy and growth. But since the landmark United Nations Framework Convention on Climate Change's (UNFCCC) Paris Agreement was signed in 2015, G20 summits have usually performed above average on this dimension, with a rising trend from 2018 to 2021. The 2018 Buenos Aires summit devoted 5% of its public documents to climate change, which rose to 10% at the 2019 Osaka summit, 12% at the 2020 Riyadh summit, and then surged to 31% at the 2021 Rome summit. The portion stayed high at 22% at Bali in 2022.

By way of comparison, on the related subject of development, G20 summits between 2008 and 2021 dedicated an average of 25% of their public communiqué conclusions to development, or five times more than to climate change [Dobson, 2022]. The portion on development

rose in 2010 to 35% at Toronto, then peaked at 58% at Seoul. The first summit in 2008 dedicated 18% of its total words to development. The two 2009 summits in London and Pittsburgh devoted 28% and 25%, respectively. In 2011, only 18% of words were on development. This rose to 32% at the 2012 Los Cabos summit, then fell to 27% at the 2013 St Petersburg summit. In 2014, this fell again to 22%.

This decline continued to 16% at the Antalya summit in November 2015, held two months after the UN summit in September that launched the 2030 Agenda SDGs. At the 2016 Hangzhou summit, the portion of words on development jumped to 25%, but then plummeted to 17% for the next three years. The 2021 Rome summit saw another jump, to 26%. But here development was surpassed, for the first time, by climate change at 31%.

Much of the G20's development conclusions deal with sustainable development, including the MDGs and then the SDGs.

Commitments

The G20 summits' production of precise, future-oriented, politically binding commitments on climate change have mostly mirrored this trend in their conclusions. From 2008 to 2022, G20 summits made 133 climate commitments. They usually made fewer than 10 per summit, with only four exceptions. Three of these exceptions came after the Paris Agreement was signed. The 2017 Hamburg summit started this rising trend with 22 commitments (for 4% of the total). This plunged to three (3%) at Buenos Aires in 2018, rose to 13 (9%) at Osaka in 2019, plunged back to three (3%) at Riyadh in 2020, rose again to 21 (9%) at Rome in 2021, and stayed close at 18 (8%) at Bali in 2022.

Compliance

The subsequent value of these G20 climate change commitments has been small when measured by its members' compliance with them after the summit and before new commitments could be made at the subsequent summit.

Of the G20's 115 climate commitments from 2008 to 2021, 50 priority ones have been assessed for G20 members' compliance. Compliance averaged only 69%. This is below the G20's overall compliance average of 71% across all subjects. Prior to the signing of the Paris Agreement, G20 climate compliance averaged 66% and fluctuated widely, reaching as low as 42% for St Petersburg in 2013 and as high as 93% for London in 2009. Since then, compliance has averaged 72% and become more consistent. In 2015, compliance with Antalya's climate commitments reached a high of 85%, boosted by the UN climate summit at Paris at the end of that year. Compliance stayed relatively high at 79% for Hangzhou in 2016. Since then, compliance has remained in the 60–70% range. For Hamburg in 2017 it was 64%, for Buenos Aires in 2018 it was 71%, for Osaka in 2019 it was 68%, for Riyadh in 2020 it was 84%, and for Rome in 2021 it was 76%.

By member, compliance since the start is led by Germany with 94%, France and the United Kingdom with 90% each, Canada with 88%, the EU with 87%, and Australia with 84%. In the middle are Korea with 77%, China with 73%, Japan with 70%, Italy with 69%, Argentina with 65%, Brazil, India, and the United States with 64% each, and Mexico with 63%. At the bottom are Indonesia with 56%, South Africa with 52%, Russia with 39%, Turkey with 38%, and Saudi Arabia with 34%.

Contributors to G20 Climate Compliance

What factors contribute to these changes in G20 climate compliance? Among a long list of possibilities, starting with the trilogy of specificity, summits, and shocks, six leading candidates currently stand out: explicit links to sustainable development, the 2030 Agenda and specific SDGs in the G20 summit climate commitments; explicit links in those commitments to the “UNFCCC” or its COPs, including the Paris Agreement (which is legally binding in its process if not aspirational outcomes); the presence during the same year of SDG summits; UNFCCC COP climate summits or special climate-focused summits; and specific climate shock-activated vulnerabilities recognized by G20 leaders themselves in their G20 summit communiqués.

Sustainable Development References in G20 Climate Commitments

Specific references to sustainable development or to the 2030 Agenda itself in the G20 climate commitments strongly coincide with, and seem to support, stronger compliance with those commitments.

Most broadly, of the full set of 394 G20 priority commitments across all subjects that have been assessed for compliance by the G20 Research Group, only 17 (4%) include an explicit reference to sustainable development or the 2030 Agenda. These 17 commitments have higher compliance than the other assessed G20 commitments—an 80% average compared to the 71% average for all.

These 17 commitments span only three core subjects—development broadly, climate change (SDG 13), and gender (SDG 5). On the core subject of climate change, 50 commitments were assessed for compliance. The nine sustainable development/2030 Agenda-explicit ones averaged 81% compliance, while the other 41 averaged only 65%. On the core subject of development, of the 56 commitments assessed, the seven sustainable development/2030 Agenda-explicit ones had an identical average of 81% compliance and the remaining 49 again averaged only 65%. The outlier is gender. Of the 17 commitments assessed thus far, the one sustainable development/2030 Agenda-explicit one averaged 55% and the other 16 averaged 65%.

Thus, embedding the compliance catalyst of sustainable development or the 2030 Agenda into the G20’s climate change and development commitments seems to support higher compliance overall. This may be because sustainable development has a wide definition that can capture many members’ implementing policy actions that count for compliance. These broad actions could bring more positive benefits for the other SDGs, and for society beyond, by encouraging linkages between issues, such as those between climate change and socio-economic issues or between development and the environment. But they could still benefit from greater specificity, including links among specific SDGs, such as SDG 13 with SDG 5.

UNFCCC-COP and UN-SDG References

The second candidate is an explicit reference to the UNFCCC or its annual COPs in the G20 climate commitment.

The 20 climate commitments that explicitly reference the UNCCC or its COPs and its agreements almost always do so in a supportive way. Compliance with them averaged 72%, compared to 65% for the ones with no such reference [Warren, 2022]. The 54 commitments that explicitly referenced the SDGs averaged 80% compliance, versus 66% for those that did not [Dobson, 2022].

UN SDG Summits as a Contribution to G20 Climate Compliance

The third candidate comes from surrounding summit support, starting with the UN summit in September 2015 that launched the SDGs.

Overall, the G20 summits' 50 priority climate commitments assessed for compliance from 2009 to 2021 averaged only 69% compliance. However, of these, the 27 assessed from 2015 to 2021, after the UN's SDG summit had taken place and the SDGs had arrived, averaged 72% compliance. In contrast, the 23 assessed from 2009 to 2014, when the earlier Millennium Development Goals from 2000 provided the relevant regime, compliance averaged only 66%, with great variation across the range of commitments.

Thus, the arrival and presence of the SDGs coincided with, and seems to have supported, a solid increase of 6% in G20 members' compliance with their leaders' summit commitments on climate change. This inference is supported by the fact that the SDGs covered all G20 members and that all 17 SDGs were designed to support each other, including SDG 13 on climate change. Thus, the strength of the SDGs in part lies in the inbuilt design of mutually reinforcing goals. Strengthening this with direct and explicitly stated linkages within G20 commitments therefore has potential as a compliance-enhancing catalyst.

Having the G20 strengthen its support for the SDGs also has the potential to maintain momentum, even in times of crisis. The G20's compliance with its climate commitments from the June 2019 Osaka summit up to the November 2020 Riyadh summit was just 68%. This was on par with the overall average, but much lower than that for other key peak compliance years. Partway through this period, from 21–27 September 2019, the UN held the first SDG summit following the 2015 launch event [UN, 2019a]. It culminated in the release of a political declaration that reaffirmed the 2030 Agenda [UN, 2019b]. In this period, the COVID-19 virus spread rapidly, diverting attention and reversing progress on the SDGs overall and the reinforcing support of the G20 for them. Yet, pandemic and crisis response and preparedness would benefit from a holistic "One Health" approach that engages with the range of SDGs, including the amplifying and feedback loop cycles of pollution and emissions.

The UNFCCC and UN Climate Summits as Contributors to G20 Climate Compliance

The fourth candidate is the presence of the periodic summits of the UNFCCC COP, notably those in Copenhagen in 2009, Paris in 2015, and Glasgow in 2021.

As noted above, prior to the signing of the Paris Agreement the G20's climate compliance averaged only 66% and fluctuated widely for the eight summits held from 2008 to 2014. Then, from 2015 to 2021, compliance averaged 75%. In the lead up to, and following, the UN's Paris summit in December 2015, compliance rose to 72% and became more consistent, reaching a high of 85% for the G20's 2015 climate commitments. The durability of the Paris summit's impact is seen by the subsequent pattern of G20 climate compliance. It stayed relatively high at 79% for Hangzhou in 2016, fell to 64% for 2017, but rose to 71% for 2018, 68% for 2019, and 74% for 2020. Then, from the October 2021 Rome summit to the November 2022 Bali summit, compliance rose to 76%, with the UN COP Glasgow summit coming in between, in December 2021.

Special Climate Summits

The fifth candidate is the number, timing, and type of the special climate-focused summits mounted in addition to, or apart from, the UNFCCC's COPs [Kirton, Kokotsis, Warren,

2022]. These started in December 2017 with the One Planet Summit in Paris hosted by French president Emmanuel Macron and expanded in frequency, focus, and form through to April 2021 with the Leaders' Summit on Climate hosted in Washington DC by U.S. president Joe Biden [Kirton, Kokotsis, Warren, 2022] (see Appendix D). None of these special climate summits were created or hosted by the G20 as a club or by its host that year, unlike those the G20 added for health and then for Afghanistan in 2021.

There were 10 such special climate summits from December 2017 to April 2021: one each in 2017 and 2018, two in 2019, and three each in 2020 and 2021. Their performance ranged from limited for one in 2019, two in 2020, and one in 2021, to strong for the last one in April 2021. Their level of performance coincided with their host, with those hosted by G20 members (France's Emmanuel Macron and the U.S.' Joe Biden) having stronger performance and those hosted by non-G20 members (the UN's Antonio Guterres and the Netherlands' Mark Rutte) having less. The host country's power also seems to matter, with Joe Biden hosting the only strongly performing one.

The relationship between these 10 special climate summits and G20 summit climate performance in the same year suggests that the former did coincide with and supported the latter, but on a cumulative rather than annual basis. From December 2017 to April 2021, when the first 10 special summits took place, G20 climate compliance averaged 73%, well above the 69% average since the start in 2009. These five years also saw the two with the highest number of G20 commitments: 2017 with 22 and 2021 with 21. However, the overall pattern suggests that outside forces might be propelling both the advent and rise in the number of special climate summits and the rise in G20 climate compliance and commitments during this time.

Shock-Activated Vulnerability

The sixth candidate is thus the G20's communiqué-recognized, shock-activated vulnerability (SAV) on climate change. This variable combines the number of outside, exogenous physical climate shocks in a year and their recognition by G20 leaders as such through their specific reference to them in their G20 communiqué that year (which usually comes toward the end of each calendar year).

From 2015 to 2020 there were no such climate SAVs recognized in G20 summit communiqués [Kirton, Kokotsis, Warren, 2022, Appendix F]. Then, at Rome in October 2021, two vulnerabilities appeared, both among the nine vulnerabilities recognized there. In this Rome communiqué there were no climate shocks, but there were 24 on health among the 27 recognized shocks. The following year, at Bali in November 2022, the first climate shock appeared. It came among the 30 shocks that were again led by health with 22. There were no climate vulnerabilities among the five recognized ones.

This suggests that communiqué-recognized, shock-activated vulnerabilities could propel rising G20 climate compliance and commitments, but largely at higher levels than have appeared thus far. They also show the importance of diversionary shocks on subjects, above all, health, not explicitly related by G20 leaders to those on climate change.

Conclusion

Summary of Key Findings

This analysis yields three major findings. First, the UN SDGs seem well designed, with SDG 13 dedicated to climate change and five of the 17 SDGs explicitly devoted to other key environmental domains. But only three of the 16 SDGs beyond SDG 13 contain an explicit cli-

mate change target, and only one each. The core SDG 13 on climate action has only two targets that link climate change to other SDGs, those on education and gender equality. Moreover, progress toward the climate-related goals and targets, which was partial but promising at the start, stalled and then reversed after 2019 with the outbreak of the COVID-19 pandemic.

Second, the G20 summits, since their start in 2008, have increasingly added commitments on climate change, reaching a total of 133 by the Bali summit in November 2022. But members' compliance with them averaged only 69% and rose to only 76% with those from the Rome summit in October 2021. G20 performance on this key dimension has thus fallen further behind the more rapidly growing global need.

Third, G20 climate compliance coincides with, and seems supported by, six factors, most of which are low-cost measures under G20 leaders' direct control. These are explicit links within the climate commitments to sustainable development, the 2030 Agenda, and specific SDGs; similar references to the UNFCCC, its COPs and the Paris Agreement; and the presence of UN SDG summits, UNFCCC COP summits, and special summits on climate change, largely during the same year as the G20 summit. Also relevant are G20 communiqué recognized shock-activated vulnerabilities on climate change.

Suggestions for Policy Action

These findings are sufficient to support recommendations to G20 leaders on how to improve their performance on climate change and how the SDGs can be mobilized to help. These recommendations begin with the fact that solving the existential threat of climate change requires ambitious, transformative, and urgent action from UN and G20 members to rapidly reduce the anthropogenic sources of greenhouse gas emissions into the atmosphere and expand the sinks that remove and store them, while ensuring socio-economic justice. This action should be elevated at the UN's SDG summit and the G20's New Delhi summit, both being held in September 2023. At their forthcoming G20 summits, G20 leaders should thus commit to:

- improve measurement of the SDGs through better monitoring and data collection, prioritizing the planetary SDGs for which only one in three of the 169 targets have sufficient data to adequately monitor progress [OECD, 2022];
- take a holistic approach to SDG governance within the G20 and agree on actions that recognize linkages and that inform domestic policymaking, such as the climate-health link, the nature-disaster reduction link, and the environment-food-peace link;
- commission third-party, independent feasibility studies, and immediately act upon their recommendations, to phase out major fossil fuel operations, including coal, oil, and natural gas, centring justice, equity, and the related socio-economic SDGs;
- fully comply now with their long overdue, regularly repeated commitment from 2009 to phase out inefficient fossil fuel subsidies and thus cut an estimated 20% of greenhouse gas emissions, trillions of dollars in public expenditure, the disease and deaths from polluting, subsidized fuel, and the crime and corruption that such subsidies bring;
- increase investment in research and development for innovations in the frontier technologies of tidal and wave energy, green hydrogen, and critical mineral recycling. This should link to support the SDG suite, starting with SDG 13 on climate action, SDGs 14 and 15 on biodiversity and SDG 6 on clean water. It should expand linkages with SDGs 4.4 and 8 on vocational training and decent work, SDG 12 on responsible consumption and production, SDG 7 on affordable energy access, and SDGs 5 and 10 on gender and broader socio-economic inequalities. It should ensure the free, prior, and informed consent and land rights of Indigenous peoples;

- strongly support the UN in its climate change and sustainable development action, including by making explicit, supportive references in G20 commitments to both the 2030 Agenda and the UNFCCC;
- recognize much more often and broadly in their communiqués the climate-related, shock-activated vulnerabilities, including slow onset ones, that are devastating and threatening G20 members and the world beyond.

The most recent survey for the World Economic Forum found that climate change and environmental destruction now make up half of the top 10 risks to humanity over the next two years [WEF, 2023]. This rises to six of the top 10 risks over the next 10 years. Failure to mitigate climate change, failure to adapt to climate change, extreme weather and disasters, and biodiversity collapse are the top four risks over the next decade. A major outcome of this will be a steep rise in climate refugees—the 5th ranked WEF risk is “large-scale involuntary migration.”

Suggestions for Further Research

This analysis also yields several suggestions for further research, as follows:

- add more data on G20 commitments and compliance, both at the summit and the relevant ministerial meeting level, to enable increasingly confident analysis of the relative causal salience of the six candidates largely explored only individually in the analysis reported here;
- analyze how synergistic G20 commitments that combine references to both climate and health (or climate change and other related subjects or prominent shocks such as finance) do and can improve compliance;
- assess the climate commitments and compliance of the special climate summits starting in 2017 to see how much they have contributed to advancing climate action, both directly and by supporting the performance of the regular G20 and UNFCCC COP summits;
- explore key features of the summit process, such as the influence wielded by fossil fuel and plastic producers attending the UN’s annual climate and biodiversity conferences, with these results supporting action for COP 28 in late 2023 to strengthen its ability to change the systems causing climate change. From this, explore the impact of climate disinformation and create tools for the public and decision-makers to identify tactics such as greenwashing;
- assess how G20 summits, in their conclusions, commitments, and compliance, and the SDGs and their targets (starting with SDG 12 on responsible production and consumption) consider the dynamics of capitalism itself and its critical components as a root cause of climate change and what recommendations for future G20, UN, and special summit action should be based on these results.

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Appendix A: The UN's 2030 Agenda Sustainable Development Goals

SDGs in bold are identified as environmental SDGs.

1. No Poverty
2. Zero Hunger
3. Good Health and Wellbeing
4. Quality Education
5. Gender Equality
- 6. Clean Water and Sanitation**
- 7. Affordable and Clean Energy**
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
- 11. Sustainable Cities and Communities**
12. Responsible Consumption and Production
- 13. Climate Action**
- 14. Life Below Water**
- 15. Life on Land**
16. Peace, Justice and Strong Institutions
17. Partnerships for the Goals

Appendix B: Links to Climate Change Beyond SDG 13

SDG	Goal		Target	Target Text
1	No poverty	End poverty in all its forms everywhere	1.5	By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters
2	Zero hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	2.4	By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality
7	Affordable and clean energy	Ensure access to affordable, reliable, sustainable and modern energy for all	7.2	By 2030, increase substantially the share of renewable energy in the global energy mix
			7.a	By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology

SDG	Goal		Target	Target Text
11	Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient and sustainable	11.b	By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disaster, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels
			11.5	By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
12	Responsible consumption and production	Ensure sustainable consumption and production patterns	12.c	Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor the affected communities
14	Life below water	Conserve and sustainable use the oceans, seas and marine resources for sustainable development	14.3	Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

Appendix C: G20 Performance on Climate Change

Summit	Domestic political management		Deliberation		Direction setting				Decision making		Delivery		Development of global governance			
	#	%	Words		Globalization for all	Priority placement	Democracy	Human rights	# commitments	% all commitments	Commitments		Inside		Outside	
			#	%							Score	% (#)	Official level	# references	# bodies	# references
2008 Washington	0	0%	47	1.3%	0	0	0	1	0	0%	-	0	0	0	0	0
2009 London	0	0%	45	1%	0	1	0	0	3	2%	-0.10 (45%)	0	0	0	1	1
2009 Pittsburgh	1	5%	762	8.2%	0	4	0	0	3	2%	+0.86 (93%)	0	2	2	10	6
2010 Toronto	1	5%	376	3.4%	0	0	1	0	3	5%	+0.42 (71%)	0	0	0	6	4
2010 Seoul	2	10%	351	2.2%	0	2	1	0	8	5%	+0.05 (53%)	3	10	7	16	9
2011 Cannes	2	10%	654	4.6%	0	0	1	0	8	3%	+0.38 (69%)	0	4	2	19	11
2012 Los Cabos	0	0%	410	3.2%	0	0	1	0	6	2%	+0.59 (80%)	5	8	3	12	8
2013 St Petersburg	1	5%	888	3.1%	0	1	0	0	11	4%	-0.17 (42%)	3	6	5	14	7
2014 Brisbane	0	0%	232	2.5%	0	0	0	0	7	3%	+0.51 (76%)	0	0	0	4	2
2015 Antalya	0	0%	597	4.3%	0	0	0	0	3	3%	+0.70 (85%)	1	2	2	4	3

Summit	Domestic political management		Deliberation		Direction setting				Decision making		Delivery		Development of global governance					
	#	%	Words		Financial stability	Globalization for all	Priority placement	Democracy	Human rights	# commitments	% all commitments	Commitments		Inside		Outside		
			#	%								Score	% (#) assessed	Official level body created	# references inside	#bodies	# references	#bodies
2016 Hangzhou*	0	0%	787	2.5%	0	1	0	1	0	2	1%	+0.58 (79%)	100% (2)	3	4	3	5	4
2017 Hamburg	0	0%	3,600	10.4%	0	0	1	1	1	22	4%	+0.27 (64%)	41% (9)	11	11	5	26	9
2018 Buenos Aires	0	0%	398	4.7%	0	0	0	0	0	3	3%	+0.41 (71%)	100% (3)	0	0	0	3	3
2019 Osaka	0	0%	655	9.9%	1	1	0	0	0	13	9%	+0.35 (68%)	34% (6)	1	3	3	10	9
2020 Mar. Health (Riyadh)	0	0%	0	0	0	0	0	0	0	0	0%	—	—	0	0	0	0	0
2020 Riyadh	0	0%	681	12%	2	1	0	0	0	3	3%	+0.68 (84%)	100% (3)	0	2	2	4	2
2021 Oct. Afghan. (Rome)	0	0%	0	0	0	0	0	0	0	0	0%	—	—	0	0	0	0	0
2021 GHS (Rome)	0	0%	0	0	0	0	0	0	0	0	0%	—	—	0	0	0	0	0
2021 Rome	3	5%	3,092	31%	5	6	1	5	2	21	9%	+0.52 (76%)	14% (3)		2	2	6	5
2022 Bali	0	0%	2,233	22%	5	2	0	1	3	18	8%			0	3	1	8	3
Total	10	—	15,808	—	13	11	10	12	7	134	—	6.05	—	57	37	149	86	57
Average	0.6	0.0	848.4	6.7	0.5	0.6	0.6	0.7	0.3	7.3	3.6	0.37 (69%)	44% (50)	3.4	2.3	8.8	5.2	3.4

Summit	Domestic political management		Deliberation		Direction setting				Decision making		Delivery		Development of global governance											
	#	%	Words		Financial stability	Globalization for all	Priority placement	Democracy	Human rights	# commitments	% all commitments	Commitments		Inside		Outside								
			#	%								Score	% (#) assessed	Official level body created	# references inside	# bodies inside	Official level body created	# references inside	# bodies inside	# references	# bodies			
Summit	#	%	#	%	Financial stability	Globalization for all	Priority placement	Democracy	Human rights	# commitments	% all commitments	Score	% (#) assessed	Official level body created	# references inside	# bodies inside	Official level body created	# references inside	# bodies inside	# references	# bodies	Compliance	Delivery	Development of global governance
			Words				Direction setting			Decision making					Inside	Outside								
	Domestic political management		Deliberation																					

Notes:

Last updated: Brittany Warren, February 3, 2023

Domestic Political Management includes all explicit references by name to the full members of the Summit that specifically express the gratitude within the context of climate change of the institution to that member. The % of members complimented indicates how many of the 20 full members received compliments within the official documents, depending on how many full members there were that year.

Deliberation to number of times climate change is referenced in the G20 leaders' documents for the year in question. The unit is the paragraph. % refers to the percentage of the overall number of words in each document that relate to the climate change.

Direction Setting, as Priority Placement refers to the number of times climate change is referenced in the chapeau or chair's summary for the year in question. The unit of analysis is the sentence. The number in parenthesis refers to environment references. Democracy refers to the number of times there was a reference to democracy in relation to climate change. Human rights refers to the number of times there was a reference to human rights in relation to climate change. The unit of analysis is the paragraph.

Decision Making refers to the number of climate change commitments. Delivery refers the overall compliance score for climate change commitments measured for that year. % Assessed represents percentage of commitments measured. The numbers in parenthesis refer to energy commitments.

Development of Global Governance. Inside refers to the number of references to institutions inside the G20 made in relation to climate change. Ministerial refers to ministerial groups. Official Level refers to official level groups. Outside refers to the number of external multilateral organizations related to climate change. The unit of analysis is the sentence.

*2016 Hanzghou Communiqué reference to climate change-GGA: “We are determined to foster an innovative, invigorated, interconnected and inclusive world economy to usher in a new era of global growth and sustainable development, taking into account the 2030 Agenda for Sustainable Development, the Addis Ababa Action Agenda and the Paris Agreement. The unit of analysis is the sentence.

Appendix D: Special Climate Summits

Date	Summit	Location	Host	Performance	Climate Conclusions	Climate Commitments	Climate Compliance
2017 December 12	One Planet Summit	Paris	Macron	Significant	3,600	22	67%
2018 September 26	One Planet Summit	New York	Macron	Substantial	398	3	71%
2019 March 14	One Planet Summit	Nairobi	Macron	Small	655	13	67%
2019 September 21–23	UN Climate Action Summit	New York	Guterres	Significant	655	13	67%
2020 September 24	High-Level Roundtable on Climate Action	New York (Virtual)	Guterres	Small	681	3	85%
2020 September 30	UN Biodiversity Summit	New York (Virtual)	Guterres	Small	681	3	85%
2020 December 12	Climate Ambition Summit	Paris (Virtual)	France/UK/UN	Significant	681	3	85%
2021 January 11	One Planet Summit on Biodiversity	Paris (Virtual)	Macron	Solid	3,092	21	76%
2021 January 25	Climate Adaptation Summit	Paris (Netherlands)	Rutte	Small	3,092	21	76%
2021 April 22–23	Leaders’ Summit on Climate	Washington (Virtual)	Biden	Strong	3,092	21	76%
2022 February 9–11	One Ocean Summit	Brest (France)	Macron	n/a	3,092	18	n/a
2023 March 1–2	One Forest Summit	Libreville (Gabon)	Macron and Bon-go	n/a	n/a	n/a	n/a
Average 2017–2021					1,196	6	66%

Notes: n/a = not available