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Commentary on the contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change

Significance:

The Working Group III (WGIII) contribution to the 2022 IPCC Report (AR6) provides an updated global assessment of the climate change mitigation process in terms of developments in emission reduction and mitigation efforts, and an assessment of the impact of national climate pledges in relation to long-term emissions goals. New additions are chapters on the social aspects of mitigation and on innovation, technology development and transfer. One of the key messages of the Report is that accelerated and equitable climate action in climate change mitigation and adaptation is critical to sustainable development, with synergies and trade-offs between the SDGs and mitigation and adaptation options highlighted, making connections with the AR6 WGII report. A well-resourced just transition is core to shifting South Africa's development pathway to increased sustainability, and fostering climate-resilience and low GHG emissions.

The Working Group III (WGIII) contribution to the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) provides an updated global assessment of the climate change mitigation process in terms of developments in emission reduction and mitigation efforts, and provides an assessment of the impact of national climate pledges in relation to long-term emissions goals. The Report builds on previous IPCC reports, including the WG III contribution to the IPCC's Fifth Assessment Report (AR5), the WGI and WGII contributions to AR6 and the three Special Reports in the Sixth Assessment cycle, in addition to other United Nations (UN) assessments.

Novel aspects of the AR6 WGIII report include the addition of two new chapters, one on the social aspects of mitigation (Chapter 5)¹ and one on innovation, technology development and transfer (Chapter 16)². Chapter 5 explores the 'demand side' of mitigation in terms of drivers of consumption and greenhouse gas (GHG) emissions and is complementary to the sectoral chapters (Chapters 6–11) which explore the 'supply side' of mitigation in terms of what produces emissions. Chapter 16 considers how a well-designed system of innovation, with the support of well-designed policies, can contribute to mitigation and adaptation and achieving Sustainable Development Goals (SDGs), while avoiding undesired consequences of technological changes.² The key role of technology is addressed in various chapters of the Report, for example, in the context of sectoral chapters (Chapters 6–11), and in terms of cross-sectoral mitigation technologies and their co-benefits or trade-offs (Chapter 12).

The WGIII report places climate change mitigation in the context of sustainable development and assesses risks and co-benefits of mitigation options which cut across sectors and include carbon dioxide removal techniques. One of the key messages in the Report is that 'accelerated and equitable climate action in mitigating, and adapting to, climate change impacts is critical to sustainable development'³. The Report reinforces that mitigation goes hand-in-hand with achieving many of the SDGs, highlighting synergies and trade-offs between climate change mitigation and adaptation, making connections with the AR6 WGII report.

The WGIII report illustrates that average annual GHG emissions during 2010–2019 were the highest in human history and have continued to rise across all major groups of GHGs – however, the rate of growth has slowed and there is increased evidence of climate action.³ Since AR5, there has been a consistent expansion of policies and laws addressing mitigation which have led to the avoidance of emissions that would otherwise have occurred and led to increased investments in low GHG-technologies and infrastructure.³ The Paris Agreement has led to policy development and target-setting at national and sub-national levels, in addition to enhanced transparency of climate action and support.⁴

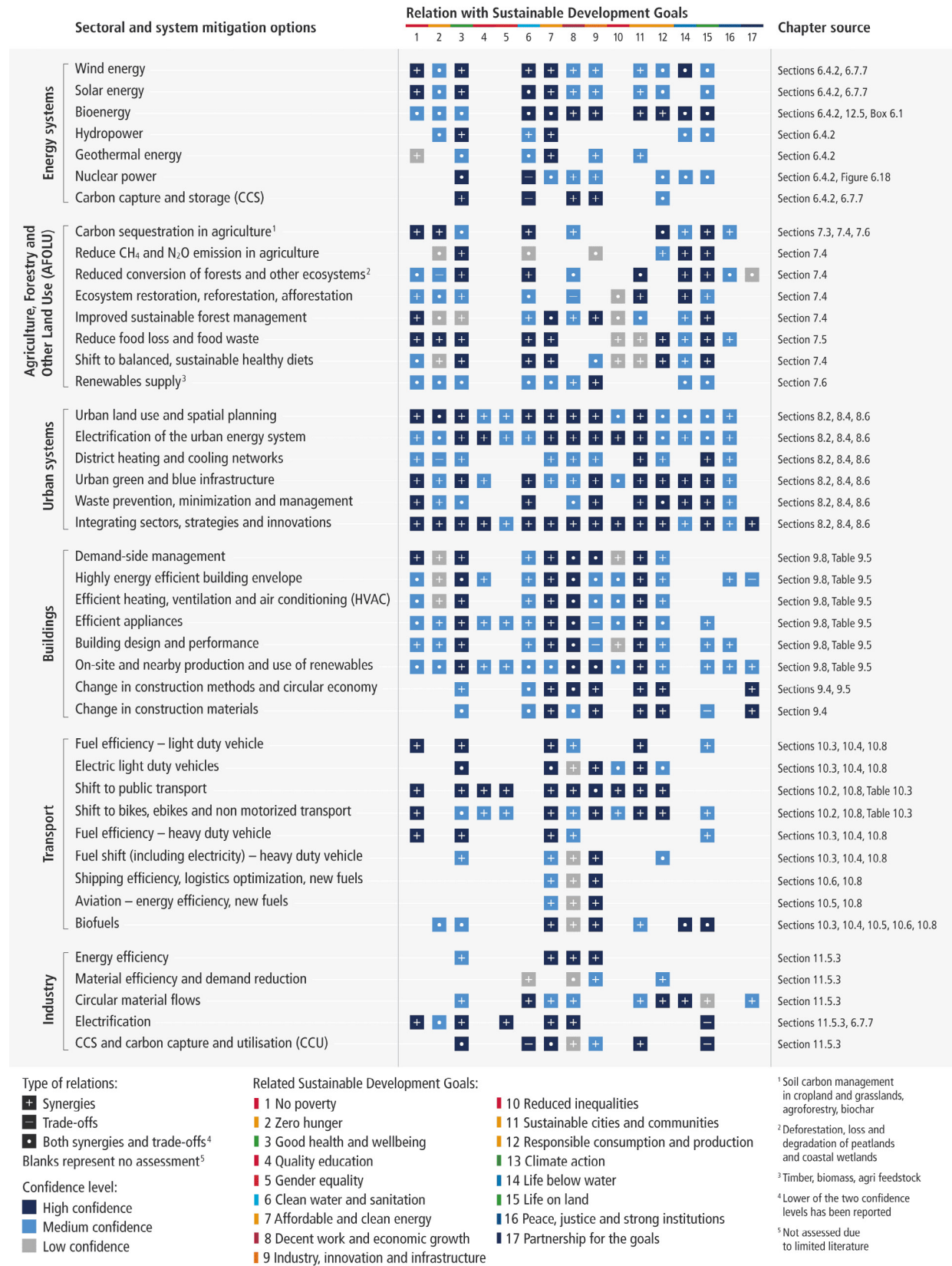
Nationally Determined Contributions (NDCs), a central instrument of the Paris Agreement which reflect national efforts to reduce GHG emissions and build resilience to the impacts of climate change, have increased climate ambition as successive NDCs represent an increase in emissions reductions and reflect the party's highest possible ambition. Current policies, however, are insufficient to achieve mitigation targets in NDCs, and sufficient international support is not yet available to developing countries that quantified support needs and requested support.⁵ An 'emissions gap' (i.e. the difference between the emissions with NDCs in 2030 and mitigation pathways consistent with the temperature goals) persists and is made worse by an 'implementation gap' in terms of what implemented policies are expected to deliver and what the ambitions laid out under the full implementation of the NDCs are projected to achieve.³

The WGIII report provides a detailed sectoral assessment of mitigation options and emphasises that many mitigation options are available in all sectors which can offer substantial potential to reduce net emissions by 2030; however, the relative potentials and costs vary across countries and in the longer term compared to 2030.³ Based on this sectoral assessment, options to reduce GHG emissions to at least half of the 2019 level by 2030 are available at a cost of USD100/tCO₂-eq.⁶ In addition, options which cost less than USD20/tCO₂-eq make up more than half of the 2030 reduction potential available for all sectors.⁶

There is growing consensus that integration of mitigation and adaptation will advance progress towards sustainable development.⁷ The rationale behind the integration of adaptation and mitigation in practice is explored in the WGIII report, including approaches to integration using climate-resilient pathways, ecosystem-based solutions, and a nexus approach.⁸ The synergies and trade-offs vary and are dependent on development context including: inequalities with consideration of climate justice; means of implementation; intra- and inter-sectoral interactions;

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Mitigation options have synergies with many Sustainable Development Goals, but some options can also have trade-offs. The synergies and trade-offs vary dependent on context and scale.



Source: Figure SPM.8 in the Summary for Policymakers of the WGIII report.³

Figure 1: Synergies and trade-offs between sectoral and system mitigation options and the SDGs.

cooperation between countries and regions; the sequencing, timing and stringency of mitigation actions; governance; and policy design.³

Synergies between adaptation and mitigation are included in many of the NDCs submitted to the United Nations Framework Convention on Climate Change (UNFCCC), as part of overall low-emissions climate-resilient development strategies.⁹ The specific adaptation and mitigation linkages will differ by country and region. Developing countries, for example, recognise that adaptation actions in sectors such as agriculture, forestry and land-use management can reduce GHGs. Urban afforestation and reforestation can contribute to carbon storage and sequestration and energy use reduction while reducing heat stress and improving water retention. But it is necessary to also be aware of the complex trade-offs that exist between bioenergy production or reforestation, and the land needed for agricultural adaptation and food security.^{10–12} The quality and pace of development in Africa can be enhanced by synergies that exist at both sectoral and national levels.⁸ An analysis of NDCs showed that top mitigation priorities in African countries include energy, forestry, transport, agriculture, and waste, while adaptation priorities focus on agriculture, water, energy and forestry.¹⁰ The agriculture sector is the main focus of adaptation measures and is a slightly larger source of GHGs than the energy sector which dominates in mitigation actions.¹¹

The SDGs adopted under the UN 2030 Agenda for Sustainable Development can be used as a basis for evaluating climate action in the context of sustainable development.^{3,6,13–15} Qualitative assessments of synergies and trade-offs between sectoral mitigation options and the SDGs are provided in the sectoral chapters of the WGIII report (Chapters 6–11: Energy Systems; Agriculture, Forestry and Other Land Use (AFOLU); Urban Systems; Buildings; Transport; and Industry). A summary of the chapter-level assessment for selected mitigation options illustrating the synergies and trade-offs between sectoral and system mitigation options and the SDGs is illustrated in Figure 1.³ Some mitigation options may have applications in more than one sector or system and interactions between mitigation options and the SDGs might differ depending on the sector or system, and also on the context and the scale of implementation. Scale of implementation particularly matters when there is competition for scarce resources. Co-ordinated policies, equitable partnerships and integration of adaptation and mitigation within and across sectors can support synergies and reduce trade-offs, and in doing so, enhance support for climate action.

The WGIII report reinforces the need to strengthen the global response to the threat of climate change, and while the next few years are critical, there are ways to improve our chances of success and contribute to mitigating climate change in the context of sustainable development. Enabling conditions include institutional design, policy, finance, innovation and governance arrangements.³ As mentioned earlier, there are numerous mitigation options available which are considered feasible to deploy at scale in the near-term. The feasibility of these options varies according to context, time, and the scale and speed of implementation. Enabling conditions would need to be strengthened to deploy these mitigation options at scale, while also reducing or removing barriers to feasibility.³

Shifting development pathways towards sustainability broadens the scope for synergies between development objectives and mitigation.⁵ Maximising synergies and reducing potential conflicts between reducing emissions and sustainable development can be supported with well-implemented mitigation policies and co-ordinated cross-sectoral policies and planning. Integrated policies can also support the creation of synergies between climate change goals and other SDGs.³

Mitigation investment flows fall short of the investment levels needed to achieve mitigation goals across all sectors and regions, and the challenge of closing these gaps is largest in developing countries as a whole.^{3,16} The WGIII report points to accelerated international co-operation on finance as a critical enabler of a low carbon and just transition. Broadening access to finance, including international finance, and to mitigation technologies, for example renewables, can act as a catalyst for accelerating climate action and achieving sustainable development.^{3,5,8,13,15} This is also key for South Africa as the basis for the country's NDC is the assumption that support will be provided for

the implementation of the updated targets and goals specified in the NDC for mitigation, adaptation, and loss and damage.¹⁷ A well-resourced just transition is core to shifting South Africa's development pathway to increased sustainability, and fostering climate-resilient and low GHG emission development, as detailed in both the mitigation and adaptation goals presented in the NDC.

Competing interests

I am a Lead Author on the WGIII contribution to the IPCC Sixth Assessment Report. I have no competing interests to declare.

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