

COMMUNITY-LED BIOECONOMY DEVELOPMENT AND NATURE-BASED SOLUTIONS (NBS) IN THE GLOBAL SOUTH: RECOMMENDATIONS TO THE G20

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The role of nature and the bioeconomy in supporting climate-resilient development has been widely advocated for in global politics. For example, the G20 New Delhi Leaders Declaration commits countries to conserving 30% of degraded ecosystems by 2030 (as per the post-2020 Global Biodiversity Framework – GBF). National governments and cities are committing to bioeconomy development, that supports the integration of nature-based solutions (NbS). However, poor communities are often excluded from climate policy and planning and rely on autonomous adaptation measures despite a lack of external financial or technical support. In addition, their involvement in the bioeconomy (for example through agriculture, forestry, and fisheries) is often overlooked. With the current G20 troika consisting of India, Brazil and South Africa, there is opportunity for global South leaders to steer the discussions on climate-resilient development toward more inclusive and just interventions. To strengthen capacity along the research-to-action value chain, towards equitable, multi-stakeholder collaboration, that puts communities at the forefront of bioeconomy development, the development of platforms for knowledge sharing and knowledge co-production to scale locally led interventions is urgently needed. The “High Level Principles on Bioeconomy” under the G20 Bioeconomy Initiative offer an opportunity to advocate for inclusive policy development and community-based natural resource management (CBNRM). Lastly, peer learning between G20 countries on inclusive best-practices for NbS and the bioeconomy can help accelerate the achievement of policy commitments, including the Sustainable Development Goals (SDGs).

Keywords: nature-based solutions (NbS); bioeconomy; communities; G20; climate change.

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DESENVOLVIMENTO DA BIOECONOMIA LIDERADA PELA COMUNIDADE E SOLUÇÕES BASEADAS NA NATUREZA (NBS) NO SUL GLOBAL: RECOMENDAÇÕES PARA O G20

O papel da natureza e da bioeconomia no apoio ao desenvolvimento resiliente ao clima tem sido amplamente defendido na política global. Por exemplo, a Declaração dos Líderes do G20 em Nova Délhi compromete os países a conservar 30% dos ecossistemas degradados até 2030 (de acordo com a Estrutura Global de Biodiversidade pós-2020 – GBF). Os governos nacionais e as cidades estão se comprometendo com o desenvolvimento da bioeconomia, que apoia a integração de soluções baseadas na natureza (Nbs). No entanto, as comunidades pobres geralmente são excluídas da política e do planejamento climático e dependem de medidas de adaptação autônomas, apesar da falta de apoio financeiro ou técnico externo. Além disso, o envolvimento dessas comunidades na bioeconomia (por exemplo, por meio da agricultura, da silvicultura e da pesca) é frequentemente ignorado. Com a atual *troika* do G20 composta por Índia, Brasil e África do Sul, há uma oportunidade para os líderes do Sul global conduzirem as discussões sobre o desenvolvimento resiliente ao clima em direção a intervenções mais inclusivas e justas. Para fortalecer a capacidade ao longo da cadeia de valor da pesquisa para a ação, em direção a uma colaboração equitativa e com várias partes interessadas, que coloque as comunidades na vanguarda do desenvolvimento da bioeconomia, é urgentemente necessário o desenvolvimento de plataformas para o compartilhamento de conhecimento e a coprodução de conhecimento para ampliar as intervenções lideradas localmente. Os Princípios de Alto Nível sobre Bioeconomia, da Iniciativa de Bioeconomia do G20, oferecem uma oportunidade de defender o desenvolvimento de políticas inclusivas e a gestão de recursos naturais com base na comunidade (CBNRM). Por fim, o aprendizado entre os países do G20 sobre as melhores práticas inclusivas para a Nbs e a bioeconomia pode ajudar a acelerar o cumprimento dos compromissos políticos, incluindo os Objetivos de Desenvolvimento Sustentável (ODS).

Palavras-chave: soluções baseadas na natureza (Nbs); bioeconomia; comunidades; G20; mudanças climáticas.

DESARROLLO DE LA BIOECONOMIA LIDERADA POR LA COMUNIDAD Y SOLUCIONES BASADAS EN LA NATURALEZA (NBS) EN EL SUR GLOBAL: RECOMENDACIONES AL G20

El papel de la naturaleza y la bioeconomía en apoyo de un desarrollo resistente al clima ha sido ampliamente defendido en la política mundial. Por ejemplo, la Declaración de los Líderes del G20 en Nueva Delhi compromete a los países a conservar el 30% de los ecosistemas degradados para 2030 (en consonancia con el Marco Global de Biodiversidad (GBF) posterior a 2020). Los gobiernos nacionales y las ciudades se están comprometiendo con el desarrollo de la bioeconomía, que apoya la integración de soluciones basadas en la naturaleza (Nbs). Sin embargo, las comunidades pobres suelen quedar excluidas de la política y la planificación climáticas y dependen de medidas de adaptación autónomas, a pesar de la falta de apoyo financiero o técnico externo. Además, a menudo se ignora la participación de estas comunidades en la bioeconomía (por ejemplo, a través de la agricultura, la silvicultura y la pesca). Con la actual *troika* del G20 formada por India, Brasil y Sudáfrica, los líderes del Sur global tienen la oportunidad de dirigir los debates sobre el desarrollo resiliente al clima hacia intervenciones más inclusivas y equitativas. Para fortalecer la capacidad a lo largo de la cadena de valor de la investigación a la acción hacia una colaboración equitativa de múltiples partes interesadas que sitúe a las comunidades al frente del desarrollo de la bioeconomía, existe una necesidad urgente de desarrollar plataformas para el intercambio de

conocimientos y la coproducción de conocimientos para ampliar las intervenciones dirigidas a nivel local. Los Principios de Alto Nivel sobre Bioeconomía en el marco de la Iniciativa de Bioeconomía del G20 ofrecen una oportunidad para abogar por el desarrollo de políticas inclusivas y la gestión comunitaria de los recursos naturales (GCRN). Por último, el aprendizaje entre iguales entre los países del G20 sobre las mejores prácticas inclusivas para la NbS y la bioeconomía puede ayudar a acelerar el logro de los compromisos políticos, incluidos los Objetivos de Desarrollo Sostenible (ODS).

Palabras clave: soluciones basadas en la naturaleza (NbS); bioeconomía; comunidades; G20; cambio climático.

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1 INTRODUCTION

Faced with development challenges and low adaptive capacity, countries in the global South suffer the most from climate change (Levy and Pats, 2015). As such, there is a need to invest in effective solutions that address the climate concerns of developing countries, while also supporting national development priorities. Nature-based solutions (NbS) offer a unique solution to safeguard people and cities from climate shocks, while also supporting bioeconomy and socio-economic development, biodiversity conservation and climate adaptation and mitigation (Liu, Jay and Chen, 2021). NbS are “actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits” (Cohen-Shachama et al., 2019) (section 3). Recently there has been much advocacy for the development of NbS to support sustainable development initiatives. For example, the United Nations (UN) Decade on Ecosystem Restoration (2021-2030) commits to preventing, halting, and reversing the loss of nature, in line with the timeframe for the achievement of the Sustainable Development Goals (SDGs), while targets 8 and 11 of the post-2020 Global Biodiversity Framework (GBF) of the Convention on Biological Diversity (CBD) specifically mention the use of NbS for reducing climate change and protecting nature (IUCN, 2022). Recent studies have also shown that approximately half of the required greenhouse gas removal can be achieved through carbon sequestration from shifts in agriculture, forestry and other land-use practices (Throp et al., 2023). With regards to climate adaptation, NbS have proven to reduce people’s socio-economic exposure and sensitivity to climate change, while enhancing people’s adaptive capacity to extreme climate events (Seddon et al., 2020).

Under its recent presidencies, the G20 has advocated for the scaling up of NbS. For example, in 2022 under the Indonesia presidency,

commitments were made to “step up efforts to halt and reverse biodiversity, including through NbS and ecosystem-based approaches”, and under India’s presidency in 2023, the G20 New Delhi Leaders Declaration committed countries to conserving 30% of degraded ecosystems by 2030 (Dickson and Hicks, 2023). The importance of the bioeconomy (section 3) for socio-economic development is also growing globally, with currently at least 50 countries having developed national bio-economy strategies (Gardossi et al., 2023). In 2016, an International Sustainable Bioeconomy Working Group was also developed under the UN Food and Agriculture Organisation (FAO), which supports countries in building sustainable national bioeconomies, while also creating a platform for knowledge exchange, peer learning and partnership building for bioeconomy development.

Under Brazil’s 2024 G20 presidency, the role of nature in addressing climate change and development concerns has been widely advocated for. Social justice and equality have also featured prominently, with Brazil announcing its key theme for its presidency, Building a Just World and Sustainable Planet and three key priorities: i) fighting inequality, promoting social inclusion and fighting hunger; ii) combatting climate change, promoting energy transition and sustainable development; and iii) reforming global governance institutions. As a leading country in the global South and being part of important global fora such as the G20 and BRICS,⁵ Brazil has a unique opportunity to bring the bioeconomy and NbS to the forefront of sustainable development discussions- drawing on the importance of preserving and financing its natural resource reserves (in particular its extensive forest cover). As South Africa takes over the G20 presidency in 2025 (and with the African Union (AU) now being a permanent member of the G20), momentum can be built to ensure that global South countries continue advocating for the preservation and restoration of their natural resources. However, to ensure the most equitable and just outcomes of such discussions, there is a need to ensure the inclusion of communities, while also advocating for their leadership and ownership of relevant NbS and bioeconomy interventions.

2 FROM G20 PRESIDENCY TO COP30: BRAZIL’S UNIQUE LEADERSHIP POSITION FOR ENHANCED CLIMATE ACTION

Brazil currently sits in a unique leadership position, being the current G20 president, and being the chosen host of the United Nations Framework Convention on Climate Change (UNFCCC) COP30⁶ to be held in 2025, as well as the chair of BRICS in 2025. As such, Brazil has extensive leveraging power to frame the

5. Acronym for Brazil, Russia, India, China and South Africa.

6. 30th Conference of the Parties.

direction of global climate action over the next two years. So far, Brazil has put social justice at the forefront of the G20 climate conversations with the intent of incentivising people-centred climate finance investments (Buchner, Miranda and Netto, 2024). This comes at a pivotal time with COP29 being named the Finance COP as countries will decide and commit to a New Collective Quantified Goal on Climate Finance (NCQG). Increased climate financing is urgently required to meet the Paris Agreement's goal of limiting global warming to below 1.5 °C, with current estimates at USD 4.3 trillion annually, of which USD 1 trillion annually is required for emerging economies (excluding China). Currently, emerging economies receive only 27% of the finance needed for climate change, with the global gap on adaptation financing currently sitting between USD 194 billion and USD 366 billion per year (Netto, Rizzo and Feitosa, 2023).

To overcome financing barriers for climate action, leaders from the global South have increasingly been calling for global financial architecture reform. For example, the Nairobi Declaration, adopted at the Africa Climate Summit in September 2023, calls for “concrete, time-bound action on the proposals to reform the multilateral financial system” and puts forth nine recommendations to accelerate the disbursement of equitable financing for Africa (Africa Union, 2023). Brazil, under its current G20 presidency, is leading conversations on global financial architecture reform through its International Financial Architecture and Sustainable Finance Working Groups. A new Multilateral Development Bank (MDB) Roadmap is currently being developed through the G20, which will showcase how such reforms can help scale climate finance investments and make them more accessible and affordable to developing countries. The Roadmap is scheduled to be submitted for approval by member countries in October 2024, which creates significant momentum for establishing the NCQG at COP29 in November. Brazil's G20 presidency is thus an important framework upon which the COP process can build off, as global leaders commit to increasing (affordable) climate finance flows that target the most vulnerable nations and people.

In 2025, countries are also required to submit their revised Nationally Determined Contributions (NDCs) to the UNFCCC. With Brazil taking over the COP presidency from Azerbaijan in 2025, it will play a vital role in assessing and incentivising the direction of focus for country's economy wide climate planning, in line with the 1.5°C goal. Brazil has also established a Task Force for the Global Mobilization against Climate Change (Task Force Clima) and the Bioeconomy Initiative, bringing both climate and biodiversity to the forefront of G20 discussions. Through Taskforce Clima, Brazil coordinates the responses of the Sherpa and Finance tracks to enhance global macroeconomic and financial alignment for all countries to implement the goals of the Paris Agreement. The Bioeconomy Initiative signals the first time that bioeconomy development has

risen to such a high political agenda. A set of High-Level Principles on the Bioeconomy will be established through the Initiative and integrated into the Rio Declaration at the end of the Brazilian Presidency in November 2024. Given Brazil's reliance on the Amazon biome for GHG removals and biodiversity, the country has a unique positioning to advocate for increased nature financing, that speaks to enhancing resilience to climate change, while also safeguarding the rights of Indigenous Peoples and Local Communities (IPLCs). By leading by example and fostering shared dialogue on NbS and inclusive bioeconomy development, Brazil can play a key role in the delivery of more equitable and effective climate solutions (Buchner, Miranda and Netto, 2024).

The current G20 troika is also represented by countries from the global South, namely: India, Brazil and South Africa. As such, in the lead up to the handover of the G20 presidency to South Africa, there is opportunity to build momentum for increased attention to climate change and global South issues. South Africa will also be representing the AU under its presidency, which was made a permanent member of the G20 at the G20 Summit in India in 2023. Africa, which represents just 4% of global missions, is highly vulnerable to climate change with majority of the population reliant on natural resources for their livelihoods (Ayompe, Davis and Egoh, 2021; Egoh et al., 2012). As such, NbS, the safeguarding of natural resource-based livelihoods and people-centred approaches are important climate agendas for Africa- as mentioned in the AU Climate and Resilient Development Strategy (2022-2032) (Chevallier, 2022). South Africa has also invested in its own bioeconomy development and NbS. For example, the country has a standalone policy for ecosystem-based adaptation (a sub-set of NbS) i.e. the Strategic Framework and Overarching Implementation Plan for Ecosystem-based Adaptation, which is currently under review, and has a National Bioeconomy Strategy and National Bioeconomy Portal. While the recommendations in this paper are targeted at the Brazil G20 presidency, the uptake and support thereof are applicable to all G20 countries. As such, South Africa's 2025 G20 presidency and the representation of the AU in the group are important to ensure that African agendas and priorities for community-led initiatives are also brought to the forefront of climate discussions.

3 DEFINING NATURE-BASED SOLUTIONS AND THE BIOECONOMY

NbS involve working with nature to help solve a variety of social development issues (Seddon et al., 2020). As mentioned previously, NbS are "actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits" (Cohen-Shachama et al., 2019, p. 21). Given that natural ecosystems provide a range of vital ecosystem services

(e.g. carbon sequestration, flood control, water filtration etc.), it is important to protect, effectively manage and conserve these ecosystems to enable them to provide these services to their maximum capacity. NbS encompass various nature-based approaches such as ‘ecosystem-based adaptation’, ‘ecosystem-based mitigation’ and ‘eco-disaster-risk reduction’, and as such can be used to overcome a variety of environmental and social challenges (Seddon et al., 2020). Relevant examples of NbS include mangrove reforestation to reduce exposure to coastal flooding, agroforestry, reforestation and urban green roofing to reduce runoff from storms etc. To further define and clarify what constitutes an intervention as NbS, International Union for Conservation of Nature (IUCN) and its Commission on Ecosystem Management have developed a set of eight criteria and associated indicators⁷ for NbS.

While NbS is a relatively new concept, people have been working with nature for centuries to enhance their well-being and way of life (Cohen-Shachama et al., 2019). In recent years, the benefit of working with nature for social development has been widely advocated for by the science community, and as such NbS has become recognised as an effective mechanism for climate adaptation and mitigation (especially in developing countries with vast natural resources) (Chausson et al., 2020). NbS are often more cost effective than traditional hard engineering adaptation options (e.g. the construction of sea-walls), and also provide multiple co-benefits such as improved health and quality of life, enhanced biodiversity conservation and the creation of green jobs (Raymond et al., 2017). For example, restoring natural forests in upper catchments can help to protect communities down-stream from flooding, while increasing carbon sequestration and protecting biodiversity (Seddon et al., 2020). This makes NbS attractive and affordable adaptation options for countries from the global South- contributing to meeting not only their climate goals, but various SDGs as well.

While the term ‘bioeconomy’ has become widely known in recent years, it currently lacks a globally agreed upon definition. Countries have varying definitions on what constitutes their national bioeconomy, which raises questions about methodologies for measurement and the valuation of nature (Mittra and Zoukas, 2020). In addition, the bioeconomy cuts across many different sectors and includes subsets of traditional sectors which are measured in national income accounts. As such, developing metrics and indicators for tracking bioeconomy development remains a challenge, and depends on which economic activities are included in its definition (National Academies, 2020). However, despite these challenges, national governments, regional economic communities and global

7. IUCN Global Standard for Nature-based Solutions establishes eight criteria and associated indicators: societal challenges, design at scale, biodiversity net-gain, economic feasibility, inclusive governance, balance trade-offs, adaptive management, mainstreaming and sustainability.

political fora (such as the G20) are increasingly recognising the importance of the bioeconomy as a key contributor to socio-economic growth (Stephenson and Damerell, 2022). While traditional sectors such as agriculture, livestock and forestry are widely noted in many national bioeconomy policies, the rise of bio-tech (e.g. genetic engineering, DNA sequencing), the production of biomass, and the circular economy, are increasingly becoming important contributors to national and global bioeconomy policy development. In particular, recognising that moving away from fossil fuels to bio-based products for energy production, and the need to address issues of food security and health, have underpinned the integration of bioeconomy development into sustainable development agendas (Bugge, Hansen and Klitkou, 2016). As such, NbS form part of the bioeconomy, and must be recognised as viable solutions to increasing national and regional bioeconomy development and economic growth.

4 THE IMPORTANCE OF COMMUNITY-LED NBS AND BIOECONOMY INITIATIVES IN THE GLOBAL SOUTH

Communities rely on nature for their everyday sustenance (whether that be for food, fuel, medicine etc.), and thus are important partners in the co-design of effective and just NbS and bioeconomy interventions (ILO, UNEP and IUCN, 2022). NbS have also shown to enhance ecosystem stewardship and instill a sense of ownership and pride within vulnerable communities (Ershad Sarabi et al., 2019). Communities are also constantly working with nature to safeguard themselves from climate disasters, and efforts need to be made to both learn from these initiatives, and advocate for community-led NbS and bioeconomy development, that are supported by inclusive and just regulatory frameworks and financing.

However, communities are often disconnected from the formal economy, and as such their needs and concerns are often not accounted for in policy making and implementation (Sack and Mc Lean, 2024). Communities can thus bear negative consequences such as loss of land, restriction to natural resources and access to markets as a result of conservation or bioeconomy efforts. At worst, NbS has been accused of exacerbating dispossession of IPLCs (Chandrasekaran et al., 2021). It is thus important that NbS and bioeconomy implementation does not impede on the livelihoods, traditions and cultures of local communities, and that unintended negative environmental consequences are avoided. For example, efforts to increase bio-energy production could result in deforestation and displacement of local communities, and have additional unintended knock-on effects such as negative externalities for biodiversity and increased illegal logging (Gardossi et al., 2023). A lack of inclusive NbS and bioeconomy development, may also force communities to adapt autonomously to the adverse effects of climate change, resulting in unplanned negative

trade-offs. For example, in Tanzania, autonomous adaptation action by local communities resulted in maladaptation when mangrove forests were cut down to make space for rice cultivation, resulting in land-use change and exposure to coastal flooding (Macamo, 2023). In other cases, positive community-led interventions often go unnoticed and unfunded, creating increased capacity and financial burdens on communities who fall outside of formalised climate action. For example, in India and Colombia, “community commons” in informal settlements have enhanced the social well-being of communities by providing ecological, cultural and socio-economic spaces that aid everyday life. While the commons hold much potential for NbS (which has been piloted through several community-led initiatives), these spaces are often unrecognised in formal urban and climate policy. Policies that speak to the implementation of NbS and bioeconomy development should thus be developed through participatory and inclusive development processes that ensures the inclusion of communities in their co-design, while also protecting their historical land tenure rights and promoting the use of Indigenous knowledge (Sack, 2023).

In addition, given that trade forms an essential part of national bioeconomy interests, there is a need to create rules and incentives to ensure existing inequalities and biodiversity loss are not exacerbated in the pursuit of national economic growth. Ensuring a fair redistribution of resources and benefits for Indigenous communities and small-scale producers is also vital (Nature Finance, 2024). As such, in line with principle 7 of the G20 High Level Principles on Lifestyles for Sustainable Development, there is a need to “recognise and amplify the role of local communities, local and regional governments and traditional knowledge in supporting sustainable lifestyles”, particularly in the context of NbS and bioeconomy development.

Two examples of community-led NbS and bioeconomy development are discussed below, showcasing how lessons can be learnt and shared from community participation in effective climate solutions that also aim to protect natural-resource based livelihoods.

4.1 Locally managed marine areas in Madagascar

In southwest Madagascar, small-scale fishers account for 82% of household income and provide over 99% of dietary protein (Gardner et al., 2020). In recent years however, over-fishing, inefficient marine resource management, and climate change, have resulted in decreased fish stocks, putting pressure on both the livelihoods of small-scale fishers and the surrounding marine ecosystems. To overcome this challenge, the government of Madagascar is collaborating with local fishers through a community-based marine resource governance model that formally grants marine management rights to local

fishers through a customary law known as *dina*. Through the establishment of Locally Managed Marine Areas (LMMAs), and with support from technical partners such as Blue Ventures, coastal communities are taking ownership for the sustainable management of marine resources through various interventions such as temporary octopus closures and mangrove rehabilitation. There are currently over 200 LMMAs, and a coastal community network called MIHARI has been established to facilitate peer learning and collaboration, while also ensuring the representation of small-scale fishers in relevant policy forums (Sack, 2023). The LMMA model has been widely recognised as an effective solution for sustainable marine management, particularly for rural and isolated areas, and as a result, has been replicated in various other countries in the South-West Indian Ocean, proving its applicability for scaling across national boundaries (Price and Boulle, 2023). For example, the Mwambao Coastal Community Network in Tanzania and Dahari in Comoros are working with local coastal communities to implement temporary octopus closures, no-take zones, reef balls, and are promoting the uptake of sustainable alternative livelihoods such as seaweed farming (Sack, 2023).

4.2 Mexico's community forest enterprises

Mexico's forest cover is extensive, with over 95% of forested land being natural (Cubbage et al., 2015). Prior to the adoption of the Forestry Law, private enterprises, through short-term concessions, controlled timber production in Mexico's forests. This resulted in mass deforestation and negative implications for surrounding Indigenous communities. Beginning in the 1970s, Mexico's forests underwent agrarian reform, which allowed Indigenous communities (or *comunidades*) and previously landless rural people whose land was expropriated by the state (or *ejidos*) to claim formal ownership of their traditional or customary lands. Currently, these communities own more than half of Mexico's forests and have a certain degree of autonomy to manage them (Cubbage et al., 2015). Currently there exist over 900 CFEs that, with the assistance of professional foresters, control the commercialisation of timber in Mexico's forests (Cubbage et al., 2015). Several different timber management schemes exist, with CFEs being classified according to their use and production of timber. For example, Type I communities own forested land but do not harvest timber for income while Type II communities sell concessions to private loggers to access their land. Type III communities harvest timber and sell their product to private sawmills, and Type IV communities harvest and process their own timber for sale (Cubbage et al., 2015). CFEs have also engaged in the commercialisation of non-timber products as well as eco-tourism and payment-for-ecosystem (PES) schemes (Cubbage et al., 2015). The success of the Mexican CFE system is partially owed to the fact that the establishment and functioning of the enterprises

is implemented with support and oversight from the state and civil society. As such, there is formal recognition of CFEs rights to forest management, with the state taking responsibility to oversee the success of the CFE system. The CFE experience has shown how community governance traditions can be successfully integrated into enterprise development, which has enabled CFEs to successfully compete on international markets. Studies have also shown that few CFEs ever go out of business (Antinori and Bray, 2005). In addition, not only are CFEs proving to benefit the livelihoods and incomes of Indigenous communities, but they are also having significant positive effects for conservation. For example, forest areas that are governed by CFEs have shown to have lower rates of land use change in Mexico's tropical areas (Antinori and Bray, 2005). Other benefits derived from the establishment of the CFEs include: "wages and benefits associated with employment, investment in public goods and welfare programs, direct profit sharing, and capital investments within the CFE" (Antinori and Bray, 2005, p. 1540). As such, the CFE model has proven that traditional and Indigenous governance structures should not be viewed as a hindrance to enterprise development, but rather may offer some competitive advantages and result in multiple co-benefits for Indigenous communities, but also for socio-economic development and biodiversity conservation (Antinori and Bray, 2005).

5 RECOMMENDATIONS TO THE G20 FOR ENHANCED COMMUNITY-LED BIOECONOMY INITIATIVES AND NBS

5.1 Support the development of community-engagement processes for co-design and co-management of natural resource policy and governance

The development of natural resource management policy and governance models that are underpinned by participatory and people-centred stakeholder engagement processes, will ensure that community livelihoods do not suffer unintended negative consequences as a result of their implementation (Cumming et al., 2021). While traditional policymaking calls for the inclusion of non-state actors in policy drafting, this often involves the submission of written inputs on pre-drafted policies, that requires access to the internet and information about such opportunities (Sack et al., 2024). Such efforts exclude local communities, and as such further efforts need to be made to ensure their inclusion by engaging in face-to-face consultations that are conducted in gender sensitive and inclusive formats. In this way, their challenges, concerns and needs can be integrated into policymaking without requiring additional incurred costs for transport and internet access. As noted in sections 4.1 and 4.2., several countries are piloting community-based natural resource management models (CBNRM). These bottom-up approaches instil community ownership but also avoid resource and

capacity constraints at the local government level. CBNRM models therefore have multiple positive outcomes and co-benefits, e.g. scaling up of effective climate solutions, ensuring livelihoods of local communities are safeguarded, and promoting increased collaboration and trust between communities and government (Siamabele et al., 2020). With Brazil leading the development of the High-Level Principles under the G20 Bioeconomy Initiative, efforts should be made to ensure that community involvement in co-design and co-implementation of natural resource policy and implementation are integrated into these fundamental principles. Ultimately it is important that communities are seen as co-collaborators in policy and implementation, rather than “stakeholders” or “beneficiaries”.

5.2 Align the G20 High Level Principles on Bioeconomy to existing relevant policy processes

Given that the bioeconomy (and NbS) cuts across many different sectors and stakeholder groups, it is important to ensure that the G20 High Level Principles on the Bioeconomy are aligned to relevant existing global policies that speak to the safeguarding and harnessing of nature for societal benefit. Not only does policy alignment aid with the efficient allocation of financial and human resource, but it also ensures coherence, efficiency and effectiveness in its implementation (Dazé, Terton and Maass, 2018). Examples of existing relevant policy process that advocate for NbS and bioeconomy development include what follows.

- 1) The Fifth session of the United Nations Environment Assembly, hosted in 2022, called for the uptake of NbS recognizing their importance in addressing unemployment.
- 2) The Paris Agreement under the UNFCCC recognises that adaptation action should follow a “participatory and fully transparent approach, taking into consideration vulnerable groups, communities, and ecosystems”.
- 3) The Post-2020 Global Biodiversity Framework recognises the contribution and rights of IPLCs as a principle guiding its implementation.
- 4) The FAO International Sustainable Bioeconomy Working Group established ten principles for a sustainable bioeconomy, that makes “communities healthier, more sustainable, and harnesses social and ecosystem resilience” (principle 4).
- 5) Other relevant policy processes include the SDGs, the UN Convention to Combat Desertification, the Sendai Framework for Disaster Risk Reduction (2015-2030) and the UN Decade on Ecosystem Restoration (2021-2030).

By ensuring that the G20 Initiative on the Bioeconomy is aligned to these (and other relevant) global policy processes, the G20 will help ensure that the group's bioeconomy agenda accelerates the achievement of sustainable development in the global South across multiple policy processes. In doing so, the G20 will play a pivotal role in global commitment to climate change (through the Paris Agreement), biodiversity conservation (through the Convention on Biological Diversity) and sustainable development (through the SDGs), among others. This will also ensure the efficient allocation of development resources for community benefit. While alignment to global policy processes is important, alignment within national policy processes is also essential to ensure that government bioeconomy agendas speak to the achievement of national climate, development, and biodiversity goals. Brazil should therefore, through its Bioeconomy Initiative and High-Level Principles, also advocate for national alignment of climate, development and biodiversity policies, while also advocating for increased collaboration between national and local government and between governments and civil society.

5.3 Support the role of knowledge platforms to strengthen capacity building across the value chain from research to action

Knowledge brokers, sometimes referred to as “change agents” are becoming increasingly recognised as important partners in enhancing climate resilient development (Butler et al., 2024). Knowledge brokering involves moving knowledge into action, through sharing of solutions from producers to users, and fostering partnerships between different stakeholders to scale climate solutions (Derickson et al., 2024). With regards to NbS, knowledge brokers aid in facilitating engagements and knowledge sharing between multiple different stakeholders (e.g. bridging the gap between government and civil society), and aid in mainstreaming NbS into urban planning practices, while sharing knowledge resources through the establishment of networks and platforms (Ershad Sarabi et al., 2019). Inclusive platforms for knowledge exchange also make Indigenous knowledge available to climate scientists and governments and aims to increase access to several knowledge systems across regions, institutions and stakeholders at the interface of climate science and policymaking (Iwama et al., 2021). Several platforms have been established to foster best-practice sharing for NbS, bioeconomy development and inclusion of communities and Indigenous knowledge, as follows.

- 1) The UNFCCC Local Communities and Indigenous Peoples Platform aims to promote exchanges of experience for addressing climate change, while building capacity for engagement in policy design and implementation.

- 2) The Global Adaptation Network, established by the UN Environment Programme, the Adaptation Research Alliance, the Global Resilience Partnership, and the CLARE programme⁸ work to support knowledge sharing between countries and regional bodies on solutions for climate resilient development.
- 3) The Community-Based Adaptation (CBA) conference series is a platform where local knowledge and lived experience is sought after and valued. NbS, youth and innovation are some of the themes explored at the CBA conferences, where local solutions inspire global action.

While the establishment of such platforms is important for the inclusion of communities in policy and planning, and for exchanges of learnings across community groups, the way they are included in such fora (i.e. the means of their participation) is equally important (Petty, 1995). Communities must be encouraged to engage actively and meaningfully in such discussions rather than being bystanders and mere “participants” in knowledge brokering activities. This will ensure that they themselves are recognised as agents of change and are also respected as important partners in decision-making (Petty, 1995). Communities must be engaged using Free, Prior and Informed Consent (FPIC) principles, and in the context of climate resilient development, the eight principles for locally led adaptation will help translate knowledge into action (Hanna and Vanclay, 2013).

A significant barrier faced by many governments in the global South is a lack of capacity to develop bankable and high-quality climate projects (Arezki, 2021). In addition, project developers often lack access to funding and donor support. Through the establishment and use of country knowledge platforms, these barriers can be overcome by linking potential investors with diverse funding sources (e.g. private sector, impact investors, philanthropies etc.), while also supporting project developers and governments gain access to relevant capacity building support (Buchner, Miranda and Netto, 2024). In this regard the G20 can play a pivotal role in establishing agreeable criteria and commitments for country platforms, that could accelerate the implementation of NDCs and other climate policies, by facilitating partnerships and linking investors to project implementors (Buchner, Miranda and Netto, 2024). In addition, the G20 could develop their own knowledge exchange platform on bioeconomy, as a governance and institutional response to further this cause.

8. CLARE is a UK-Canada framework research programme on Climate Adaptation and Resilience, aiming to enable socially inclusive and sustainable action to build resilience to climate change and natural hazards in Africa and Asia-Pacific. An impact-orientated research programme, CLARE is designed to bridge critical gaps between science and action, by developing new tools and supporting partner governments, communities, and the private sector to use evidence and innovation, whilst building the capacity of both those carrying out the research and those using the resulting evidence. If you are interested to learn more and engage, please visit: <https://clareprogramme.org/>.

6 INTENDED BENEFITS AS A RESULT OF COMMUNITY-LED NBS AND BIOECONOMY INITIATIVES

The following section discusses potential, and intended, benefits as a result of the uptake of the recommendations discussed in section 5. While there is no guarantee that such benefits will definitely occur as a result of more inclusive NbS and bioeconomy development, there is evidence to suggest that such outcomes are likely (ILO, UNEP and IUCN, 2022; Cumming et al., 2021; Dazé, Terton and Maass, 2024; Egoh et al., 2012; Heimann et al., 2019). These benefits include (among others): increased trust between communities and government, poverty and inequality reduction, accelerated achievement of the SDGs, Paris Agreement and the Global Biodiversity Framework, and collaboration, partnership building and peer learning across G20 Member States. In this regard, the G20 should be a leading advocate for the development and support of community-led NbS and bioeconomy development, to help boost socio-economic growth and just climate-resilient development in the global South.

6.1 Increased trust and cooperation between communities and government

By capacitating and transferring ownership for management of natural resources to the communities that rely on them for everyday sustenance, conducive conditions for engagement between government and communities are created, building trust and acceptance for NbS interventions (Siamabele et al., 2020). Through the creation of participatory approaches for designing NbS, increased acceptance and ownership by citizens for NbS interventions is enhanced, while also promoting bottom-up learning and incorporation of Indigenous knowledge into project design (Naumann et al., 2023). In many instances, local communities have protested the implementation of natural resource management models that restrict their right to access resources or impede on their livelihoods and traditional ways of life (Ansari, 2023). For example, Peer et al. (2022) note that the implementation of Marine Protected Areas (MPAs) in South Africa has, in some cases, undermined local and Indigenous communities by reducing their access to resources and having poor governance processes that do not recognise their traditional and cultural identity. However, if co-designed and co-implemented with communities, in a way that protects their livelihoods, takes seriously their recommendations and concerns, and capacitates them on potential alternative livelihoods, then such NbS will be embraced and respected by non-state actors (Siamabele et al., 2020). For example, in Malawi, the Department of National Parks and Wildlife and Terra Global are working with local community associations to implement a carbon credit project for reduced emissions from deforestation (REDD+) (Yocum, 2016). The local community associations are

included as key partners in the management of the project, being responsible for monitoring deforestation and illegal harvesting activity, while being capacitated on alternative livelihood options and benefitting directly from the sale of the carbon credits. In this way, communities do not feel that restrictions are imposed on them, but rather embrace these initiatives, and recognise their importance as key partners in aiding national climate resilient development.

However, to facilitate the development of CBNRMs, technical and financial support from development partners and/or government is required, to ensure that these models do indeed deliver the intended climate and socio-economic outcomes. Building trust across different stakeholder groups takes time and resources, and these must be accounted for in project design and budgeting (Oliveira and Rabechini Junior, 2018). In addition, building trust requires attitudinal shifts, with government showcasing understanding of the daily struggles faced by communities, and clearly articulating how the policy or intended intervention will be co-designed/co-managed.

6.2 Poverty and inequality reduction

Climate change is exacerbating poverty and inequality in the global South. Considered a “risk multiplier”, without targeted efforts to reduce emissions and implement effective adaptation options, climate change will push more than 130 million people into poverty (Mc Lean, 2024). Locally-led NbS and bioeconomy initiatives can help stagnate the impact of climate change on poverty and inequality, by diversifying the livelihoods and incomes of communities while making them more resilient to climate change. The WWF and ILO (2020) recognise that thriving ecosystems create multiple employment opportunities, for example in eco-tourism and restoration programmes, while also increasing the availability of natural resources for harvest. In addition, the growth of the bioeconomy through for example, advancements in bioprocessing, can create new employment and upskilling opportunities. For example, in South Africa, the government invested R1 billion (approximately USD 54 million) in implementing the National Biotechnology Strategy of 2001. This funding went toward the development of targeted projects, as well the establishment and incubating of companies and platforms. These investments supported more than 400 science graduates, created approximately 1000 jobs and produced more than 20 patents (South Africa, 2013). In addition, government support (financial and technical) for local bioeconomy innovation can help increase local competitiveness on international markets and reduce reliance on imports (South Africa, 2013). This will require investing in local businesses and developing local skills, aiding countries in the global South to financially compete with emerging and developed countries.

In addition, NbS projects are often accompanied by capacity building for alternative livelihood generation, for example through beekeeping and seaweed farming. In this way, local communities are capacitated to diversify their income streams and skills, allowing them to continue earning when climate change poses a threat on their traditional livelihoods. Through the diversification of livelihoods, NbS can also empower communities, especially women, to save and enhance their financial management skills. For example, in the Solomon Islands and Papua New Guinea coastal communities are being capacitated on sustainable fisheries management practice. Through this initiative, 1000 women across 33 communities have established women's microfinance savings clubs, and have participated in financial literacy training, while one community reported having 11 different income sources (WWF and ILO, 2020). As such, through several avenues, investments in NbS and the bioeconomy can contribute to global poverty and inequality reduction.

6.3 Accelerated achievement of the SDGs, Paris Agreement and post-2020 Global Biodiversity Framework

Given the cross-sectoral nature of the bioeconomy and NbS, supporting their implementation can help accelerate multiple global environmental and development policy processes (ILO, UNEP and IUCN, 2022). This includes the SDGs, Paris Agreement and the post-2020 GBF. As discussed in earlier sections, NbS and bioeconomy activities result in multiple co-benefits, such as biodiversity conservation, job creation and climate adaptation and mitigation, and as such, their contribution to global development policy processes must be acknowledged. Countries are increasingly mainstreaming NbS and bioeconomy activities into their national climate, biodiversity and development plans, recognising their importance as an accelerator for sustainable development. A study by Bakhtary, Haupt and Elbrecht (2021) found that in 2021, 92% of countries included NbS in their NDCs (an increase of 10% from the previous year). However, a key challenge inhibiting the uptake of NbS and bioeconomy activities is a perceived lack of return on their investments, especially for adaptation action (Sack, 2023). Currently the required investment to preserve and restore ecosystems is estimated at between USD 300 billion and USD 400 billion per year, however only USD 52 billion is currently invested annually (UNDP, 2022). The G20 should therefore promote investments in NbS and bioeconomy activities by advocating for their importance in enhancing sustainable and climate resilient development, particularly for vulnerable communities in the global South.

In addition, given that the global North is a net importer of natural resources from the global South, there is a need to ensure that national bioeconomy agendas are aligned to sustainability criteria that take into account cross-border

implications (Heimann, 2019). As such, Brazil and the G20 must ensure that the Bioeconomy Initiative recognises production spill over effects, and the need for fair and global sustainability focused measures that advocate for global bioeconomy development. Ultimately by aligning the G20 High Level Principles on Bioeconomy to existing frameworks such as the SDGs, Paris Agreement and the GBF, G20 country resources will be efficiently spent on targeted interventions that seek to contribute to multiple development agendas, while enhancing climate resilience, supporting biodiversity conservation and socio-economic development.

6.4 Increased collaboration, partnership building and peer learning across G20 Member States

Through the establishment and use of platforms and networks for knowledge sharing on NbS and the bioeconomy, multi-stakeholder partnerships for effective climate solutions can be established. Multi-country and multi-stakeholder partnerships can also lead to innovative financing mechanisms and increased investments in NbS that are meaningful, innovative and locally led. In addition, the creation of a dedicated G20 platform for inclusive NbS and bioeconomy development can enhance peer learning and best-practice sharing between G20 Member States, helping countries to achieve their national climate and development goals. In addition, the use of such platforms can help amplify community and civil society voices in the global South, to ensure the needs and priorities of the most vulnerable are accounted for in climate change policy and planning.

7 CONCLUSION

With G20 countries being responsible for approximately 70% of global emissions and 80% of global Gross Domestic Product (GDP), the group has a responsibility to lead on the implementation of the global climate agenda (Netto, Rizzo and Feitosa, 2023). In recent years, there has been significant progress in integrating climate and biodiversity concerns as key G20 priorities, however, there is need for these conversations to take a just and inclusive approach, by prioritising the role that communities can play in building climate resilient development in the global South. NbS and the bioeconomy offer a unique opportunity to integrate communities into national climate action, with current science and evidence proving that such interventions result in a range of co-benefits to society (Raymond et al., 2017; Siamabele et al., 2020). As such this paper advocates for the upscaling of community-led NbS and bioeconomy development that draws on the lessons and best practices from countries in the global South that have successfully piloted and implemented these approaches.

Brazil's unique positioning as the current G20 president, and the 2025 UNFCCC COP30 host, also creates an opportunity for Brazil to lead conversations on international policy development that advocates for community led climate action (e.g. through the adoption of the Rio Declaration under its current G20 presidency, and the COP30 agreements). With much headway being made on the Bioeconomy Initiative under the G20, other global policy fora, such as The Convention on Biological Diversity (CBD) COP (COP16) to be held in Colombia in October, also provide opportunity for the G20 to continue playing a leading role in (inclusive) bioeconomy development. In addition, with South Africa taking over the G20 presidency for 2025, the needs and priorities for Africa (South Africa will be key in representing the AU), will require greater attention. To further this cause, this paper puts forward three recommendations to the G20 presidency of 2024: i) support the development of community-engagement processes for co-design and co-management of natural resource policy and governance; ii) align the G20 "High Level Principles on Bioeconomy" to existing relevant policy processes; and iii) support the role of knowledge platforms to strengthen capacity building across the value chain from research to action. Uptake of these recommendations could result in multiple long-term positive benefits for global South countries. This includes (among others): i) increased trust between communities and government; ii) poverty and inequality reduction; iii) accelerated achievement of the SDGs, Paris Agreement and post-2020 Global Biodiversity Framework; and iv) increased collaboration, partnership building and peer learning across G20 Member States.

Ultimately, supporting community-led bioeconomy development and NbS in the global South is essential to ensuring climate-resilient development is equitable, sustainable and "leaves no one behind". Given the G20's global importance and influence in geo-political discussions centred on climate and development is it imperative that the group advocates for community leadership in bioeconomy development, and the uptake of locally led climate solutions. In addition, partnership building and collaboration between global North and South countries in the identification and development of community-led initiatives will also be an important avenue through which the current global socio-economic divide can be closed, thereby fostering meaningful global cooperation for climate and development.

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