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SOUTH–SOUTH COOPERATION for Climate Adaptation and Sustainable Development

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EXECUTIVE SUMMARY

Climate change is a serious global challenge, but its ramifications are felt more severely by developing and the least developed countries because of the greater incidence of climate-related hazards (e.g., in small island developing states), their limited response capacities and lack of adequate financial and technical resources. According to the Global Climate Risk Index 2021, the ten countries which have been most affected by climate change in the period 2000-2019 are all developing and least developed countries. There is therefore an urgent need for developing countries to reduce their vulnerabilities through well planned national and regional climate adaptation policies which complement international efforts to build their resilience.

While developed countries, accounting for the major share in historical global emissions, have acknowledged responsibility for the climate crisis and for solving it through "common but differentiated responsibilities" including transfers of finance and technology from developed to developing countries, these initiatives lack effective implementation. Other existing international efforts to build resilience in developing and least developed countries include the national adaptation programme of action (NAPAs), but according to IPCC (2022a) these adaptation efforts are fragmented, small in scale, sector-specific, slow on implementation and unevenly distributed globally.

Given the existing institutional, technological, and financial gaps in overcoming vulnerabilities to climate changes in the global South, South-South cooperation and economic integration can provide a complementary and viable way forward for the Global South. Learning from selected well-planned climate mitigation and adaptation policies of the North, this paper identifies four core mutually reinforcing principles on which South-South cooperation for climate adaptation can be based. These are:

a. Prioritizing climate adaptation in the broader economic development agenda

b. Adopting a systemic approach to climate adaptation;

c. Providing mutual support with concrete action for building financial and technical capacities for climate adaptation; and

d. Shaping international agenda on climate adaptation through solidarity and coordination.

Climate adaptation and economic development need to go hand in hand to achieve sustainable development goals. This will require putting climate adaptation at the centre of national development plans. While it is often argued that being economic latecomers developing countries can draw on already existing clean technologies for their energy transition, the existing patent regime and limited financial resources makes this extremely difficult. Moreover, from a policy perspective it is becoming increasingly difficult to separate the mitigation and adaptation challenges with a growing recognition that stronger state capacities are needed to manage a comprehensive green transition tailored to local circumstances. That not only implies a heightened commitment to tackling the climate adaptation challenge in developing countries but doing so in an integrated and coherent manner while using an inter-sectoral coordinated approach towards macroeconomic, financial, trade and industrial policies. This integrated approach towards climate adaptation needs to be reinforced at the regional level.

Regional integration strategies in the South need to aim at not only regional growth and development but also at building regional resilience to climate change. This can happen only if a more systemic approach to climate adaptation is applied. A comprehensive regional climate adaptation strategy in the South needs to be designed to support and complement country-level climate adaptation plans. Climate adaptation also needs to be integrated into regional financial cooperation frameworks.

For such a comprehensive approach to South-South cooperation for climate adaptation, it is extremely important that developing countries support each other's efforts for raising financial resources and building

technological capacities and technical capabilities. While South-South cooperation cannot substitute North-South cooperation for enhancing climate adaptation capacities of developing countries, it can play an important complementary role.

Mutual support through pooling of human, financial and institutional resources can help developing countries to progress rapidly on their national climate adaptation plans. With rising international attention devoted to climate change, mutual support and common positions can play an important role in strengthening the voice of developing countries in international climate negotiations and discussions Developing countries can work together to track, monitor and evaluate their financial, technical and institutional capacity building needs and ensure that the climate funding commitments of developed countries are fully and timely met. South-south solidarity is also required to ensure that adequate efforts are made in different international fora to facilitate patent free green technology transfers.

The Global South has lagged the North in terms of setting up an effective national and regional climate adaptation agenda. Based on the above four core principles and learning from the selected regional climate adaptation strategies of the North, like the EU Adaptation Strategy, Cooperation for Climate Adaptation in Nordic countries and other cooperation and collaboration initiatives amongst developed countries like the Green Growth Group (informal group of climate ministers from 16 EU Member States, UK and Norway), the paper proposes an eight-point South-South Cooperation Agenda for Climate Adaptation. The agenda comprises the following eight steps under 3 of the guiding principles noted earlier:

I. Collaboration on adaptation strategies

1. Mainstreaming climate adaptation in national and regional development agendas.
2. Injecting and allocating financial resources in regional development banks for supporting climate adaptation.
3. Building capacity for climate friendly digital transformation of the South.

II. Technology and knowledge sharing

4. Creating Green Patent-Free Technology Banks in the South.
5. Promoting regional climate risk assessment centres.
6. Setting up climate adaptation research networks in the Global South.
7. Establishing knowledge-sharing platforms on climate adaptation in the South

III. International coordination

8. Building South-South solidarity and common positions in climate negotiations in the UNFCCC and climate discussions at the WTO and other multilateral fora.

Learning from the identified successes of the North, the Global South needs to embark on a green, low carbon and climate resilient development trajectory which requires mainstreaming their climate adaptation policies into their national and regional development plans. This requires green industrialization policies at the national level to diversify away from dependency on a small number of climate-sensitive sectors. This will necessarily include achieving energy transition, resource security and low carbon agriculture and food security, with integrated capacity to adapt to oncoming climate impacts. Sectoral policies alone are found to be insufficient to address the climate associated development challenges. For green industrialization, a cross-cutting and systemic shift is required including favorable legal frameworks, domestic capability formation, standard setting training, tax incentives and joint research programs. Incentives for the use of renewable energy needs to be designed at the national and regional level. Investments need to be channelized and promoted towards green solutions, clean energy, smart cities and digital startups for building climate-resilient regions.

Regional cooperation and integration can go a long way in achieving these objectives for the South. Many regional development banks in the South are now in the process of designing their climate change policies, e.g., the Islamic Development Bank (IsDB), the New Development Bank (NDB) of BRICS, the Asian Infrastructure Investment Bank (AIIB), and the ASEAN Catalytic Green Finance Facility. However, the current funds in these banks dedicated to climate adaptation is only a fraction of what is needed to avoid costly and catastrophic future impacts. It is important to boost the capacities of regional development banks by injecting new funds dedicated to climate adaptation and improving their climate related expertise.

Green transition is costly and challenging for the Global South in the face of limited access to green technologies. However, most of the innovations with respect to environment-friendly technologies are taking place in the developed world and are patented. Green Technology Banks can be established in the Global South where identified patent-free green technologies can be made available as 'public goods.' These technologies like climate resistant crops, water management systems, innovative construction methods and materials, etc. can greatly assist developing countries to progress on their NDCs.

In the digital world, given the global digital divide, developing countries are latecomers to new technologies. However, this disadvantage can be used by developing countries to pursue a greener, more resilient pathway to digitalizing their economies. South-south digital cooperation agenda (as proposed by UNCTAD, 2018), can help in building awareness and promoting access to green digital technologies and other climate adaptation related policies and initiatives.

Further, at the regional level, the six Regional Collaboration Centres (RCC) set up by UNFCCC to support implementation of countries' NDCs in their respective regions can play an important role. This role can be further reinforced to provide regular detailed regional risk assessments reports using common frameworks and assisting in preparing joint action plans at the intra and inter- regional levels to help their member states. These Centres could also help countries in assessing their loss and damage post climate calamities for securing international support.

With mutual support, the Global South can build a network among its universities, labs and research entities to strengthen green technological capabilities and facilitate the transfer and sharing of green technologies. Joint research proposals could also assist policy makers in their climate-related decisions by delivering application-oriented and innovative climate solutions. Establishing a knowledge sharing platforms can further provide the much-needed assistance to policymakers in designing climate adaptation policies. Sharing experiences related to climate change and climate adaptation can build south-south solidarity and help developing countries identify common challenges and solutions.

These identified common challenges and solutions can result in identifying common positions in the international climate negotiations and discussions at the COPs, the WTO and other multilateral fora like the IMF. There is a need for developing countries to work together to ensure that the pledges undertaken by the developed countries, for example providing USD 100 billion per annum to developing countries, are fulfilled so that the Global South can successfully implement green transition plans.

Developing countries also need to ensure that a positive trade and environment agenda is discussed at the WTO, an agenda which discourages unilateral initiatives that can undermine developing countries' exports further limiting their capacity to progress on their NDCs. This agenda should focus on facilitating patent-free green technology transfers; providing additional finance for promoting trade of environmentally sustainable products e.g., through the Trade and Environment Fund (as proposed by China and India, 2011); building technical capacities, especially of least developed countries (LDCs) and small islands developing states (SIDS), in setting up climate-smart infrastructure; and providing incentives like a "zero-tariff regime for plastic substitutes".

To have comprehensive and coordinated regional climate adaptation strategies, it may be useful to set up an inter-regional Secretariat within the UN system, with the mandate of boosting South-South cooperation on climate adaptation and sustainable development. This institution could also provide a common platform to the Regional Collaboration Centres, set up by UNFCCC, to work together so that the regional climate adaptation plans, complementing the national plans, can find mutual support.

Given the dynamic nature of climate change, it may be useful for developing countries to set up an Annual Ministerial Forum on Climate Adaptation and Sustainable Development. This Forum could help in designing a systemic evolving workable agenda for climate adaptation and sustainable development in the South which is mutually supported by the developing countries and helps in identifying and forming common positions on international platforms.

1. Introduction and context

The world is experiencing a dangerous change in the climate. Record-high temperatures since 1880 were experienced in 2021 over land surfaces, mostly in parts of northern Africa, southern Asia, and southern South America, while record-high sea surface temperatures were observed across parts of the Atlantic and Pacific oceans. The average temperature across global surfaces in 2021 was 1.51°F (0.84°C) above the 20th-century average[1]. According to the latest report from IPCC[2], in the last four decades, each decade has been successively warmer than preceding decades since 1850. Consequently, global surface temperature was 1.09 °C higher in 2011-2020 than 1850-1900. This global heating is reducing the snow cover and sea ice in some regions and intensifying heavy rains and forest fires in others, leading to drastic changes in the existing habitat.

In addition to the mitigation strategies aiming to reduce greenhouse gas (GHG) emissions, countries across the world are trying to adjust to this rapidly changing environment through adaptation actions, which can reduce vulnerability to the harmful effects of climate change while making most of any potential opportunities. While climate mitigation depends on a universal shift in the energy system to renewable sources and the more efficient use of all sources of energy in the transition, with a prominent role for technological changes, climate adaptation requires changing the specific ways we organize our economic and everyday lives in order to reduce vulnerabilities to localized climate shocks and stresses which are set to intensify even if we meet the most stringent climate targets by 2100.

While developed countries are well placed to design comprehensive climate policies and many have already embarked on their climate goals through the deployment of significant (though still insufficient) financing and technical resources mobilization and well-defined climate agendas, for developing and least developed countries (LDCs) climate mitigation and adaptation remain unsurmountable challenges. Not only are these countries more severely affected by climate change, but they also have much more limited resources and technical capacities to cope with climate challenges. According to the Global Climate Risk Index, eight out of the ten countries most affected by the quantified impacts of extreme weather events in 2019 belong to the low- to lower-middle income category and half of them are LDCs[3]. The ten countries which have been most affected in the period 2000-2019 due to climate change are all developing and least developed countries, namely, Puerto Rico, Myanmar, Haiti, Philippines, Mozambique, the Bahamas, Bangladesh, Pakistan, Thailand, and Nepal[4]. Developing and least developed countries therefore urgently require climate finance, green technologies and capacity building for climate mitigation and for building their adaptive resilience.

The United Nations Framework Convention on Climate Change (UNFCCC) established an international environmental treaty in 1992 between developed and developing countries to combat “dangerous human interference with the climate system” where developed countries, which bear the greatest responsibility for the climate crisis, are required to take the lead in addressing climate change and providing climate finance and technology to developing countries based on the principle of “common but differentiated responsibilities and respective capabilities.”

In 2009, at the 15th Conference of the Parties (COP 15) in Copenhagen, developed countries decided to commit to a goal of mobilizing jointly USD 100 billion a year by 2020 to address the climate mitigation and adaptation needs of developing countries. These funds were to be “scaled-up, new and additional”.

1 NOAA National Centers for Environmental Information, State of the Climate: Global Climate Report for 2021, online January 2021, https://www.ncdc.noaa.gov/sotc/global/202113.

2 IPCC AR6 WG I: Climate Change 2021: The Physical Science Basis, https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/

3 https://reliefweb.int/report/world/global-climate-risk-index-2021

4 https://www.germanwatch.org/en/19777

However, this goal has never been met. While the estimates vary, according to the OECD (2022)[5], USD 83.3 billion was provided and mobilized for climate by developed countries for developing countries in 2020, of which USD 68.3 billion was mobilized as total public climate finance (bilateral and multilateral). According to UNEP[6] total finance for adaptation reached only $46 billion in 2019/2020 which is far below what is required to respond to existing and future climate changes in developing countries, estimated in the range of USD 155 to USD 330 billion annually by 2030.

Further, in COP21, under the Paris Agreement, 196 parties committed to the goal of limiting global warming to well below 2 °C and agreed to submit their plans for climate action, i.e., nationally determined contributions (NDCs). In 2021, at COP26, countries reaffirmed their commitment to limit global heating to 1.5 °C above pre-industrial levels. While most countries submitted their NDCs, according to the UNFCCC[7], CO_2 emissions need to decrease by about 25 per cent from the 2010 level by 2030 to achieve this goal. But, assuming implementation of all the latest NDCs, in 2030, total global GHG emissions will still be 59.3 per cent higher than in 1990, 16.3 per cent higher than in 2010 and 5.0 per cent higher than 2019. This points to an urgent need for a significant increase in the level of ambition of NDCs between now and 2030. Developing countries have highlighted that for them to achieve even these limited ambition NDCs, they will need more resource, access to green technologies and capacity building.

Given the rising international climate finance gap, particularly for adaptation, it becomes important for developing countries to examine complementary arrangements that could help them in progressing towards their climate goals. South-South cooperation and economic integration can enhance financial resources for developing countries, especially through regional development banks; facilitate green technology transfers and green investments; and develop capacities in LDCs and SIDs for reducing their vulnerabilities to climate change through cooperation for climate adaptation.

This paper examines the impact of climate change on developing countries and provides the ways in which South-South cooperation can help developing countries in building climate resilience and meeting the climate adaptation goals set in their NDCs. The paper proposes building capacity of developing and least developed countries by sharing experiences on green industrial policies and proposes a positive trade and environment agenda at the WTO to secure an enabling multilateral environment for developing countries to adapt to climate changes while pursuing their sustainable development goals.

The paper shares selected successful examples of cooperation for climate mitigation and adaptation amongst the developed countries which can provide valuable lessons for the South. Based on these insights, the paper proposes four mutually reinforcing core principles for a South-South Cooperation framework for climate adaptation and presents a complementary south-south cooperation agenda for climate action.

It also underscores the importance of comprehensive and coordinated regional climate adaptation strategies and emphasises the need to set up an inter-regional Secretariat within the UN system with the mandate of boosting South-South cooperation on climate adaptation and sustainable development. To discuss and address the fast-advancing climate challenges for developing countries, organising an annual Ministerial Forum on 'South-South Cooperation on Climate Adaptation' is suggested which can work on the continuously evolving climate adaptation agenda for the South.

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5 Aggregate Trends of Climate Finance Provided and Mobilised by Developed Countries in 2013-2020 (oecd.org)

6 Adaptation Gap Report 2021

7 NDC Synthesis Report, 2021. https://unfccc.int/sites/default/files/resource/cma2021_08E.pdf

2. Global commitments by the South for climate adaptation

2.1 Climate Change Challenges are Fiercer for the South

The ongoing pandemic and global events have further weakened the economies of developing countries, limiting their financial resources and capacities to face the climate challenge. This makes it even more difficult for these countries to forge a climate-resilient development pathway, decoupling their economic growth from energy consumption and building resilience to climate shocks.

Historically developing and least developed countries have not been responsible for the excessive CO_2 emissions that are altering the planet`s climate. In fact, between 1850-2019, LDCs have contributed less than 0.4% of cumulative CO_2 emissions while the contribution of SIDS is just 0.5%, of Africa is 7% while that of South Asia is 4%. In contrast, North America and Europe together have contributed around 39%, with the share from North America being 23% while that of Europe is 16%.[8]

However, the impact of climate change has been felt more fiercely by the developing and least developed countries, both in terms of financial losses as well as human lives. While the economic impact of climate change is difficult to measure given its multifaceted nature, according to most estimates financial impacts of climate change are felt more severely in geographically or economically small countries (IMF. 2019)[9], for example, the annual cost of disasters in SIDs is more than four times that of larger countries not only because of their geographical location but also because the scale of the impact as it is a factor of their relative size.

Composition of the economy also matters. Developing countries are more vulnerable to climate change because of their lack of diversification and higher dependence on a few sectors for their growth and employment prospects. Higher dependence of LDCs on agriculture increases their vulnerability to climate changes. According to the IPCC (2022)[10] increasing weather and climate extremes have already exposed millions of people to food insecurity and reduced water security, with agriculture, forestry and fisheries being the most climate-exposed sectors on which reliance is high in developing and least developed countries, particularly West, Central and East Africa, South Asia, Central and Southern America and SIDs.

Further, high levels of public debt, exacerbated by the COVID-19 crisis, are also responsible for drastically increasing the vulnerability of developing and least developed countries to climate challenge. According to UNCTAD[11] LDCs' debt service tripled between 2011 and 2019, jumping from $10 billion to $33 billion. Fiscal constraints due to high debt to GDP ratios limit the ability of developing countries to invest in climate mitigation and adaptation strategies further increasing their vulnerabilities to climate change and spiraling a vicious circle of indebtedness.

Climate change has already caused widespread and substantial damages to ecosystem with adverse socioeconomic consequences, which disproportionately affect developing countries particularly LDCs and SIDS. Given irreversible rising temperatures and associated impacts, there is increasing attention and recognition of the adaptation that will be necessary to build climate resilience and reduce exposure and vulnerability to climate change. This section introduces the adaptation process under the UNFCCC and takes stock of progress achieved in recent years.

8 https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_SPM.pdf

9 https://www.imf.org/external/pubs/ft/fandd/2019/12/pdf/fd1219.pdf

10 IPCC. 2022. Summary for Policymakers. In: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.). Cambridge, Cambridge University Press. https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_SummaryForPolicymakers.pdf

11 https://unctad.org/topic/least-developed-countries/chart-march-2022

2.2 Climate Adaptation process under the UNFCCC system

According to the IPCC (2014), adaptation is "the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects". Adaptation has long been identified as one of the two key strategies to respond to climate change. As early as 1990, the IPCC in its very first assessment report stated that limitation (mitigation) and adaptation strategies "must be considered as an integrated package and should complement each other to minimize net costs". The UN Framework Convention on Climate Change (UNFCCC), signed in 1992 and effective since 1994, legally recognized "measures to facilitate adequate adaptation to climate change" as one of the key commitments made by contracting parties (Article 1.b), which means "it is the job of governments under the UNFCCC to continue to assist and support peoples to climate change".

Since 2001, the significance of adaptation actions has been further acknowledged as it became clearer that "mitigation alone would not be sufficient, and Parties began planning and implementing adaptation measures in earnest". (UNFCCC, 2019)[12]

Against such a backdrop, a more complete system to facilitate adaptation has been gradually established under the UNFCCC.

Following the adoption of the UNFCCC , its parties have gradually upgraded commitments in adaptation actions. In 2001, COP 7 created a work programme to address the specific needs of LDCs, which were particularly vulnerable to climate change impacts. The work programme aimed to assist LDCs to prepare national adaptation programmes of action (NAPAs) and also established the LDC Expert Group (LEG) to provide technical support. Later in 2005, COP 11 created the Nairobi work programme as a technical hub among multiple stakeholders. In 2010, COP 16 further upgraded the adaptation working mechanism through adopting the Cancun Adaptation Framework (CAF) and established the Adaptation Committee as the principal body under the UNFCCC regularly addressing "all facets of the adaptation process in a holistic and overarching manner".

The Paris Agreement in 2015 greatly reinforced the importance of adaptation and laid the foundation for what countries need to contribute to the global effort against climate change. The Agreement identifies three key climate actions areas: 1) **mitigation**, which deals with the reductions of emissions; 2) **adaptation**, which is related to measures important to prevent or minimize the damage caused by impacts of climate change, and 3) **means of implementation**, which relates to finance and technology that needs to be made available to enable developing countries to take adaptation and mitigation actions.

Mitigation action is guided by what is known as the temperature goal that aims to keep the global temperature increase to not more than 2 degrees Celsius compared to preindustrial levels with further commitments to try to keep temperature increases to 1.5 degrees Celsius. This goal has enabled countries to set quantifiable targets on emissions reduction; a level of accountability which is still lacking in adaptation action.

In terms of adaptation, the Paris Agreement also recognized that "adaptation is a global challenge" (Article 7.2) and the "importance of support for an international cooperation on adaptation efforts and the importance of taking into account the needs of developing country Parties" (Article 7.6). Therefore, the Agreement defines a "global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal" (Article 7.1). Through setting a global goal, the Paris Agreement transformed the adaptation actions from local actions to a global ambition, which will boost international cooperation including South-South Cooperation in this regard.

[12] UNFCCC 2019: *25 Years of Adaptation under the UNFCCC, Report by the Adaptation Committee,* https://unfccc.int/sites/default/files/resource/AC_25%20Years%20of%20Adaptation%20Under%20the%20UNFCCC_2019.pdf

To fulfill the ambition on adaptation, the Parties to the Paris Agreement committed to include adaptation as a component of Nationally Determined Contributions (NDCs) (Article 3). Furthermore, it set up a communication mechanism in which all countries may periodically submit and update an adaptation communication containing their priorities, implementation and support needs, plans and actions (Article 4.10).

In the COP 26 held in Glasgow in 2021, adaptation represented one of the key outcomes of the conference. Particularly, The *Glasgow-Sharm-el-Sheikh Work Programme* was established to work towards further defining what a global goal on adaptation would look like and developed countries committed to double the funding provided to developing countries for adaptation by 2025.

Under the UNFCCC, the financing mechanism to support climate adaptation actions has also been established including multilateral facilities such as the Adaptation Fund (AF), Green Climate Fund (GCF), and Global Environmental Facility (GEF) (mainly through its Least Developed Countries Fund (GEF-LDCF) and Special Climate Change Fund (GEF-SCCF)).

2.3 Commitments by the South on climate adaptation

With the increased recognition of the importance of climate adaptation and the establishment of various financing and technical supporting mechanism under UNFCCC, developing countries have been able to scale up their commitment and actions in adaptation, and also engage more actively with international cooperation in this regard.

The Paris Agreement has also created a mechanism of assessing the collective progress of countries in implementing the Agreement through global stocktaking (Article 14). The global stocktake involves the assessment of mitigation and adaptation efforts including recognizing adaptation efforts of developing countries, enhancing the implementation of adaptation action, reviewing the adequacy and effectiveness of adaptation and support provided for adaptation, and reviewing overall progress in achieving the global adaptation goal (Article 7.14). The initial process for the first global stocktake has been initiated with a view to its conclusion in 2023 at COP28.

As the scientists have found the current mitigation commitments included in the NDCs "fall far short of what is required" (UNFCCC, 2021), and will likely make the warming exceed 1.5°C and even hard to reach 2.5°C target (IPCC, 2022b)[13], it is more urgent for developing countries to take adaptation actions to reduce vulnerability and build resilience. Though more complete information may be available after the global stockstake, UNEP (2021)[14] has assessed developing countries' progress in climate adaptation, some of which is summarized below.

As of September 2021, 79% of parties have addressed adaptation through national level plan or strategy and 9% are in the process of developing national instrument. Among 154 developing countries, at least 125 have undertaken activities of formulating and implementing NAPs. For the LDCs, 72% have national plans or strategies in place while the figure for the SIDS is 82%. The report also found good progress in improving inclusiveness of adaptation planning. About 70% of countries have developed their adaptation plans through consultation with a broad range of stakeholders and 73% highlighted the importance of gender considerations.

As of September 2021, 437 principal adaptation projects had been supported through the four multilateral facilities, i.e. AF, GCF, GEF-LDCF and GEF-SCCF. In addition, between 2010-2019, 2607 projects were supported by 10 bilateral donors. Despite the growing number of adaptation projects, assessment of the outcomes of the projects remains a challenge. While the ultimate goal of adaptation is to reduce risks associated with the impacts of climate change is clear, climate hazards can be very dynamic and it is

[13] IPCC AR6 WG III: *Climate Change 2022: Mitigation of Climate Change*, https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/

[14] UNEP : *Adaptation Gap Report 2021*, https://www.unep.org/resources/adaptation-gap-report-2021

thus hard to define them in absolute and comparable values. Further, there's no universally standardized indicators to assess the success of adaptation interventions at the global level. Therefore, it's essential to identify common indicators to measure risk reduction and promote reflective monitoring, as suggested by UNEP (2021).

In terms of adaptation prioritization, more than two-thirds of countries have designed adaptation options within the identified priority sector. According to the IPCC (2022a)[15], most of all adaptation activities reported are aimed at addressing **water-related risks and impacts**. These risks include inland flooding, risks associated with water security, and climate change-induced and exacerbated droughts. Adaptation measures related to these involve early warning mechanisms, restoration of wetlands and other water retention methods, water storage and management, soil moisture conservation and irrigation. These adaptation responses also have ecological, economic, and institutional co-benefits.

Other important areas of risks and adaptation action are connected to **food security and the resilience of food systems**. These areas also have major implications for the protection of biodiversity, human nutrition, well-being, and health, as well as ecosystems and livelihoods. In terms of **health-related risks**, adaptation action is essential to prevent and respond to climate-induced surges in water-borne and food-borne diseases by improving access to water and food shielded from climate impacts. Between 2010 and 2019, new projects primarily focused on 5 areas including agriculture, water, health, ecosystems, and infrastructure (UNEP, 2021).

Despite the significant progress in developing NAPs, the IPCC (2022a) also found that current adaptation efforts are fragmented, small in scale, sector-specific, designed to respond to current impacts or near-term risks, focused more on planning rather than implementation and unevenly distributed globally. Lower-income countries have the largest gaps in their adaptation action due to limited financial allocation compared to the high cost of adaptation. Meanwhile, the institutional gaps remain particularly in terms of coordination, regulatory instruments, monitoring and evaluation, etc. According to the UNEP (2021), only 32% countries have vertical coordination mechanisms for adaptation actions in place with representatives from different governance levels. And just 26% of countries have dedicated monitoring and evaluation (M&E) systems in place. In general, the gaps in finance, technology and institutional capacities are the three key challenges for undertaking climate adaptation commitments and actions for developing countries, which will be analyzed in the next chapter.

3. Need for finance, technology and capacity building to reach climate adaptation commitments

Despite the gradual progress of developing countries in advancing climate adaptation actions in planning, communication and implementation, the major institutional, financial, and technological challenges are yet to be overcome.

3.1 Financing gap

The Paris Agreement recognized the need for financing support for developing countries' climate actions and the obligation of developed countries to provide such financing. The Agreement affirmed that "continuous and enhanced international support shall be provided to developing country Parties", and "developed country Parties shall provide financial resources to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the Convention". It stipulated that developed countries shall "biennially communicate indicative quantitative and qualitative information", including "projected levels of public financial resources to be provided to developing countries". The Agreement also emphasized that both financial and technology support should

[15] IPCC AR6 WGII: *Climate Change 2022: Impacts, Adaptation and Vulnerability,* https://www.ipcc.ch/report/ar6/wg2/

achieve "a balance between support for mitigation and adaptation". As already mentioned in Chapter 2, under the UNFCCC, four multilateral financing facilities have been established to support adaptation actions: AF, GCF, GEF-LDCF and GEF-SCCF.

Even with these established commitments and facilities, the financing gap is still the most challenging barrier for developing countries to reach their climate commitments. In terms of adaptation cost, UNEP (2016)[16] estimated that annual adaptation costs would be 140-300 billion USD by 2030, and 280-500 billion by 2050, depending on the various temperature rising scenarios. Besides modeling estimates, the review on the actual adaptation commitments included in the NDCs and NAPs provide an indication of adaptation finance needs in developing countries. UNEP (AGR 2021) found 58 developing countries included estimates of adaptation financing needs in their NDCs and NAPs, which in total is about 70 billion USD each year for 2020-2030. The first NDR17 prepared by UNFCCC secretariat presented cost estimates based on broader submitted reports from developing countries. Among those, the report found about 5.8-5.9 trillion USD needed up until 2030 to support the implementation of just 78 NDCs. The review on the NDCs/NAPs also provides some information on sectoral financial needs. Among priority areas, agriculture is the largest and may account for 26%, infrastructure for 22.6%, followed by water (15.2%), disaster (12.5%) and ecosystem (6.4%). Many available figures, however, are either already out-of-date or underestimations considering the vast data gap on adaptation financing.

To meet the huge financial needs of developing countries, in 2009 at COP 15 in Copenhagen, developed countries committed to a goal of mobilizing jointly USD 100 billion dollars a year by 2020. According to the OECD (2022)[18], climate finance flows to developing countries reached 83.3 billion USD in 2020, still about 16.7 billion short of the pledge made by developed countries, despite an increase of 4% from 2019. Many developing countries will rely on domestic resource mobilization, but of the above-mentioned NDR estimates, USD 502 billion is identified as needs requiring international sources of finance.

Among the 83.3 billion USD traced by the OECD, the public climate finance provided by developed countries totaled 70.2 billion, including 31.4 billion through bilateral channels, 36.9 billion through multilateral channels and 1.9 billion through officially supported export credits. In addition, about 13.1 billion USD of private finance mobilized in developed countries flowed to developing countries. In terms of allocation, in 2020, adaptation finance was about 28.6 billion, representing a 10.1 billion increase from 2016; mitigation finance was about 48.6 billion and finance for cross-cutting sectors was about 6 billion USD. In terms of regional distribution, LDCs received 12.6 billion USD and SIDS received 1.5 billion USD.

While giving an exact estimate of the adaptation finance gap for developing countries is challenging, the existing evidence suggests the needs are growing in the face of heightened climate related stresses and shocks, while public finance flows remained stable in recent years and may even have decreased slightly due to the covid-19 pandemic. All indications point to a widening finance gap for developing countries to undertake their climate actions (UNEP 2021).

3.2 Technology gap

Under UNFCCC, technology development and transfer to support climate actions in developing countries has been an essential element since its inception. Developed country Parties are obliged to promote, facilitate and finance technology transfer to developing country Parties under the Convention.

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16 UNEP: *The Adaptation Finance Gap Report*, 2016, https://unepccc.org/publications/the-adaptation-finance-gap-report/

17 UNFCCC Standing Committee on Finance: First report on the determination of the needs of developing country Parties related to implementing the Convention and the Paris Agreement, 2021, https://unfccc.int/sites/default/files/resource/54307_2%20-%20UNFCCC%20First%20NDR%20technical%20report%20-%20web%20%28004%29.pdf

18 OECD: *Aggregate trends of climate finance provided and mobilised*, https://www.oecd.org/climate-change/finance-usd-100-billion-goal/aggregate-trends-of-climate-finance-provided-and-mobilised-by-developed-countries-in-2013-2020.pdf

In 2010, COP 16 established the Technology Mechanism with the objective of accelerating and enhancing climate technology development and transfer. The Mechanism consists of two bodies: 1) Technology Executive Committee (TEC), which is the policy arm and provides recommendations in enhancing climate technology efforts; and 2) Climate Technology Centre and Network (CTCN), which is the implementation arm and supports concrete projects and programmes. CTCN is hosted by UNEP and has three core functions: providing technical assistance to developing countries; creating access to knowledge on climate technologies; and fostering collaboration among climate technology stakeholders. CTCN works with broad partners including 11 technical institutions and national designated entities (NDEs) from more than 150 Parties.

The Paris Agreement reaffirmed the importance of technology development and transfer for implementation, and further established a technology framework to "provide overarching guidance to the work of the Technology Mechanism in promoting and facilitating enhanced action on technology development and transfer".

Technology development and transfer is an important priority in the international cooperation agenda in terms of climate actions including adaptation. Most methods and practices of adaptation involve some form of technology, either "hard" ones like micro irrigation, rainwater harvesting, drought-resistant seeds, disease monitoring and early warning systems; or "soft" ones like insurance schemes or crop rotation patterns. In general, adaptation technologies may include those that relate to water use and management, planning for climate change variability, soil management, sustainable crop management, sustainable livestock management, sustainable farming systems, land use management, etc.

To determine climate technology priorities, Parties undertake technology needs assessment (TNAs) facilitated by the existing mechanism under UNFCCC. Since 2001, more than 90 developing countries have completed TNAs to identify their technology needs for mitigation and adaptation. 39 developing countries are currently undertaking TNAs.

According to UNFCCC, the analysis on the TNAs from 53 developing countries undertaken between 2009-2018 found several priority areas with the most technology needs, including agriculture (87%), water (79%), infrastructure/settlement (33%), climate observation (8%), human health (8%), tourism (2%), energy (2%) and others.

Since 2010, as part of their TNAs, developing countries have also developed technology action plans (TAPs), which are concrete action plans for the implementation of their prioritized technology needs So far, there are over 550 TAPs and more than 450 Project Ideas prepared between 2009-2018 that are seeking support, which indicate that the climate technologies gap for developing countries to reach their climate ambitions remains significant.

3.3 Capacity gap

The capacity gap is another significant challenge for developing countries in improving the effectiveness and success of adaptation actions. As also analyzed in section 2, insufficient mechanisms in coordination, monitoring and evaluation may stifle the climate adaptation planning process, while the absence of effective indicators and data make it difficult to assess the performance of climate adaptation projects.

The capacity gap in planning and implementing climate actions has long been recognized by Parties to the UNFCCC, which adopted two frameworks guiding capacity-building dedicated to developing countries and economies in transition respectively in 2001 at COP 7. The frameworks identified several guiding principles and approaches to capacity building related to climate actions, including no "one size fits all" country driven, addressing specific needs, taking into account specific national circumstances and priorities of developing countries, learning by doing, and recognizing the role of existing national institutions.

The framework also determined the scope of needs and priority area for capacity building for developing countries including the below areas: institutional capacity building, national climate change secretariats,

creation of enabling environment, national communications, vulnerability and adaptation assessment, implementation of adaptation measures, assessment of mitigation options, research and systematic observations, development and transfer of technology, improved decision-making, education, training and public awareness, and establishment of databases. It also identified specific scope for LDCs' needs.

Following the adoption of the frameworks, the Paris Agreement requested all developed countries to enhance support for capacity-building actions in developing countries. UNFCCC Parties have undertaken four reviews including the latest one done in 2019 at COP 25. The Review in 2019 further recognized the relevance of the framework, which however should also take into account emerging areas in the context of the Paris Agreement, the "increased capacity-building activities undertaken by a growing range of bodies and practitioners", the role of national reports in awareness-raising as well as educational activities[19].

Meanwhile, although "progress has been made, gaps and needs remain in addressing priority issues identified in the capacity-building framework under the Convention". According to the UNFCCC findings, persistent capacity gaps of government staff and insufficient institutional capacities for developing countries remain. Developing countries also emphasize in their reports to the UNFCCC the need to build the capacities of local governments and communities, particularly for adaptation. Gaps have also been identified in the areas of inter-agency and cross-sectoral coordination, mainstreaming climate considerations into their national planning and budgeting, greenhouse gas emission accounting, research and systematic observation, data collection, risk modelling, and vulnerability assessments.

It is notable that not only LDCs face capacity gaps, but also large developing countries such as the BRICS though they may be in a relatively better position in terms of policy and institutional capacities. For example, Brazil seeks to enhance its national capacity in water security, assess climate risks, manage vulnerabilities through its National Adaptation Plan, according to its NDCs. China in its Adaptation Strategy 2035 highlights three key capacity building areas including advocacy and education, team building for local governments, and public participation. India in its NDC emphasized that proper training and upgrading of skills across sectors and at both national and local levels are required. The country therefore has established various mechanism such as Indian Network on Climate Change Assessment (INCCA), Climate Change Centers, National Training Policy, Skill India, etc. South Africa in its NDC calls for support in institutional and human capacity to implement its adaptation plans. It also highlights the importance of taking long-term perspective in capacity building for adaption to the impacts of climate change.

4. Need for South-South Cooperation for Green Industrialization

4.1 Green Industrial Policies: Challenges and Opportunities

Shifting away from an unsustainable economic model centered around fossil fuels is key to overcoming climate change and mitigating its disproportional impact on vulnerable communities and countries. In its latest roadmap towards "Net Zero by 2050", the International Energy Agency (IEA) stressed the urgency of an immediate and unprecedented acceleration in clean energy investments to reach the milestones ahead. According to the IEA, the rate of energy-efficiency improvements must increase three times more than the average rate achieved over the last two decades. A 4% per year average increase to 2030 is necessary for economic growth to be decoupled from energy consumption. This requires a five-fold increase in energy capacity from solar and wind technologies, as well as the exploitation of the opportunities arising from advanced battery technologies, hydrogen electrolyzes, and direct air capture and storage.

Against this global scenario, individual developing economies face both the challenge of mobilizing large technical and financial resources and the challenge of directing them towards sustainable structural

[19] https://unfccc.int/topics/capacity-building/the-big-picture/capacity-in-the-unfccc-process

transformation. Meeting these challenges relies on the adoption of a strategic industrial policy approach to accelerate the speed of energy transition and industrial restructuring, and (re-)direct innovation and its diffusion towards sustainable prosperity and effective "decoupling" of natural resource use and environmental impacts from economic growth in developing countries.

This will require developing countries to revisit their industrial policies with the aim of greening them. According to the Trade and Development Report (TDR, 2021), industrial policies should aim not only on economic structural transformation, i.e., shifting the economic structures from low productivity towards higher productivity activities, but also aligning this shift with low carbon-intensive resource-efficient activities. As the TDR explained, green structural transformation should be understood as a critical pillar of an adaptation strategy and vice versa. Countries can become more resilient by diversifying beyond a few climate-sensitive sectors, and at the same time, industrialization should be sensitive to necessary adaptive capacity to prepare for and withstand current and future climate impacts.

In this context, there are three main areas/objectives which will require industrial policy interventions in the years to come. First, removing obstacles for achieving **energy transition** in developing countries to foster structural transformation towards a low-carbon economy and support industrial development at the same time (UNCTAD TDR 2021). The equipment to generate renewable energy (wind turbines, solar photovoltaic cells, batteries) are products of manufacturing and, just as traditional manufactures, are likely to enjoy increasing returns to scale from learning by doing and, especially as the turn towards renewable energy accelerates, expanding markets (Mathews, 2020). As such, the switch to renewable energy can help foster industrialization, while advancing the energy transition (initially through the diversification of energy sources) and reducing the vulnerability of energy security to changes in global fuel prices.

The policy measures needed to foster such a systemic shift are cross-cutting and include favorable legal frameworks, domestic capability formation and standard setting training, and research programs, tax incentives and dedicated public funds to finance required investment. The sectoral targeting should be strategic and progressive, starting with supporting the use of renewable energy in housing and agriculture and later moving to the provision of investment incentives and regulations for manufacturers to adopt domestic renewable energy sources and to manufacture parts and components for renewable energy and energy-efficiency technologies. This in turn would foster the development of a local industry.

The second policy objective is achieving **resource security**, replacing the traditional linear path of resource use with a circular economy that aims to slow the depletion of non-renewable natural resources, reduces environmental damage from their extraction and processing as well as pollution from their use and disposal. This can be achieved by increasing the efficiency and productivity of resource use and by reducing the share of material that is not reused. Moving to a circular economy requires an appropriate developmental trade framework at the global level that would leave enough space for the implementation of domestic policies and regulations that can incentivize this approach to resource use.

Third, Agri-food systems (including crops, livestock, fisheries, aquaculture, agroforestry and forestry) account for about one-third of total anthropogenic greenhouse gas emissions. Combating climate change hinges also on combining **low-carbon agriculture** and food security. One approach suggested to adapt agriculture to climate constraints is through sustainable intensification e.g., through climate-smart agriculture. This approach builds on sustainable agriculture approaches, using principles of ecosystem and sustainable land and water management and landscape analysis, and assessments of the use of resources and energy in agricultural production systems and food systems (Wollenberg et al. 2016).

Another is agroecological and related approaches (including organic agriculture, agroforestry and permaculture). While the sustainable intensification approach like the climate-smart agriculture starts from a premise that productivity per unit of land needs to increase in a sustainable manner, agroecology approach emphasizes reducing inputs and fostering diversity alongside social and political transformation focused on improving ecological and human health and addressing issues of equity and governance. For many small developing countries, agriculture is their mainstay employing large proportions of the

population. An agroecology approach builds on participatory public policies for development and benefit of all people, especially small-scale food producers and rural and urban workers.

Another, more ambitious in scope, includes the production of food from microbes. The resulting microbial biomass is rich in proteins and other nutrients. Such technologically-driven agricultural innovations, however, should be combined with agroecological approaches that can tackle climate change and food insecurity while at the same time ensuring decent income and working conditions for local farming communities.

4.2 South-South Cooperation for financing Green Industrialization

Advancing in all the areas discussed above is seriously limited by the severe constraints in the external environment enshrined in the plethora of WTO-plus agreements touching upon (and limiting) several policy areas. In such a difficult scenario, South-South Cooperation can help overcome the obstacles that have hindered progress to date. It can set up new financing mechanisms for energy transition and infrastructure development, facilitate transfer-of-technology, create the conditions for moving to a circular economy at the regional level, and more generally it can support a more ambitious development agenda that focuses on productive capacity building and green structural transformation with adequate social safety nets.

Developing countries embarking on a strategy of rapid and transformative green development should revisit the role of development banks that can provide long-term finance. The recent creation of a BRICS bank and of the Asia Infrastructure Investment Bank represent important steps to help meet the financing challenges of a green transition.

Finance bottlenecks can be alleviated by direct intervention from big emerging economies to realize ambitious projects. For example, Ethiopia entered into a South-South partnership with China for the realization of two major railway projects, namely the electrified standard gauge railway line from the capital, Addis Ababa, to Djibouti, and the Addis Ababa Light Rail Transit (LRT). The Ethiopia–Djibouti railway now connects landlocked Ethiopia via a 759 km route from Addis Ababa to the Port of Doraleh in Djibouti, which handles about 95 per cent of Ethiopia's international trade. This USD 5.1 billion railway project was co-financed by China and Ethiopia and built from 2012 to 2016 by two of China's largest railway construction companies, the China Railway Group and China Civil Engineering Construction Corporation. The USD 400 million Addis Ababa LRT project, with a total length of 31 km and 39 stations, was also co-financed by China and Ethiopia and built by the China Railway Group from 2011 to 2015. Emission reductions resulting from moving freight and passengers from road to rail are estimated at 9 million tonnes of carbon dioxide equivalent per year given that electricity for the railway is mainly generated from renewable sources (UNFCCC and UNOSSC,2018). In order to maximize mitigation potential of such infrastructure works, it's critical for countries to strategize delivery of projects which contribute to economic development, cutting emissions and building adaptive resilience.

4.3 South-South Cooperation for Waste Management

Finally, cohesive regional recycling networks, especially with respect to e-waste and metal scrap trade among countries within macro developing regions, could foster the development of an economy-of-scale refinery industry in developing economies which is instrumental to move towards a circular economy. A "Pull-and-Transformation" strategy could be adopted by regional coordination agencies so that countries follow an evolutionary approach and lock in productive and low-carbon path dependencies. In this context, industrial policies should support technology transfer, backward and forward industrial linkage development as well as business investment in relatively more advanced countries that could potentially host refinery smelters. Optimizing and harmonizing collection systems could also be pursued to improve efficiency in countries with significant e-waste streams and existing recycling schemes; and raise awareness and encourage groundswell of recycling behaviors in countries where e-waste recycling practices are not yet commonplace.

5. South-South Solidarity for a Positive Trade and Environment Agenda in the WTO

5.1 Aligning CBDR with SDT in the WTO

Aligned with the 'common but differentiated responsibilities' (CBDR) in the UNFCCC, the principle of 'Special and Differential Treatment' (SDT) for developing countries at the WTO can provide the way forward for the trade and environment agenda at the WTO. It is important to ensure that the international trading rules at the WTO do not in any way restrict the fiscal and policy space of developing countries, which may make it more difficult for them to achieve their NDCs.

The outcome document of the 12th Ministerial Conference, in para 14, recognizes environmental challenges including climate change and notes the importance of the multilateral trading system to the environmental dimension of the SDGs in so far as they relate to WTO mandates. In the para, the respective needs, and concerns of Members at different levels of economic development has been recognized and the importance of providing relevant support through technology innovation has been reaffirmed. The role of the Committee on Trade and Environment as a dedicated forum for dialogue amongst the Members on the relationship between trade and environmental measures has also been accepted.

With respect to trade and environment, while developed countries have coordinated their positions e.g., through G7 trade ministers' meetings and have initiated action, such as the EU's Carbon Border Adjustment Mechanism, developing countries do not yet have a coordinated or proactive position. Given the adverse implications of some of these initiatives on their economies and developmental policy space, as also on their adaptive capacities, developing countries need to identify their key areas of concern and interest.

To facilitate environmentally sustainable growth in their economies through both actions at the national level and collective cooperation at the international level, it is important that developing countries adopt a Positive Trade and Environmental Sustainability Agenda, which addresses the existing global technology, financing and capacity gaps. Based on the core principles of CBDR and SDT, this Agenda should focus on facilitating green technology transfers from developed to developing countries; create additional finance for developing countries; and build their capacities to address climate challenges facing their tradeable sectors.

5.2. Facilitating technology transfers at the WTO

On trade related green technology transfer issues, developing members should propose expanding the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) flexibilities for developing countries in relation to climate-related goods in the WTO, such as waiving TRIPS enforcement of IPRs applicable to green technologies. This is one way in which countries' commitments under the WTO and the UNFCCC and Paris Agreement with respect to technology transfer can be made mutually consistent.

One such example of using these flexibilities in practice is in respect of the "rules of exhaustion". Exhaustion can be universal or territorial. In the first case, the patent-holder cannot limit the distribution of the item once it has been sold. This opens the way for parallel importing and the possibility for others to compete with the patent-holder in other countries. The rule of territorial exhaustion on the contrary limits the right to sell the item without authorization from the patent-holder. These different systems provide different incentives for technology transfer and innovation. While parallel imports increase competition and can lead to lower prices and greater accessibility of technology, they may discourage innovation by limiting patent-holders' profits. Regional exhaustion could be an attractive compromise solution. Here, parallel importing would be allowed only when the product was sold within the region at issue. By creating geographical buffer zones for patent protection, yet at the same time allowing for parallel importing, regional exhaustion might properly balance technology transfer with incentives to innovate.

But developing countries should also rally together to a move beyond the current intellectual property framework and propose the adoption of a brand new "Declaration on TRIPS and climate change" crafted to clarify existing flexibilities and offer new incentives for the transfer of environmentally sound technologies, both for adaptation and mitigation purposes. Compulsory licensing should be facilitated for environmentally sound technologies and procedures for challenging patents should be made less cumbersome to lower costs faced especially by more vulnerable economies. Furthermore, a tiered fee system for intellectual property rights should be introduced by waiving payments for patent-holders who authorize transfer of climate-friendly technologies to developing countries.

Other initiatives to facilitate green technology transfers could include open sourcing key green technologies and declaring them as public goods; an agreement to waive the payment of IPR royalties to the patent holders of climate-related goods; and an agreement to have a climate waiver on WTO dispute settlement over cases involving domestic climate change-related measures by developing countries (such as subsidies to develop domestic green economic sectors) that might be inconsistent with WTO rules.

5.3 Trade and Environment Fund in addition to Climate Finance

Lack of finance is one of the major obstacles to an environmentally sustainable structural transformation. Given the complexities of international climate finance architecture and its associated challenges, developing countries need additional funds associated with their trade and environment goals. WTO members could consider creating a dedicated Trade and Environmental Sustainability Fund (as also proposed by China and India in 2011)[20] to support both national green transformation priority areas and regional climate cooperation among developing countries. Promoting economic growth along with respective climate agendas is a shared mission for all developing countries, which takes trade and environmental sustainability issues fully into account in their policy formulation.

5.4 Creating Incentives and Building Capacities

A positive trade and environment agenda needs not only to focus on bridging the global technology and financing gaps in climate adaptation but should also facilitate developing countries progress on their NDCs by incentivizing their exports. It is important to ensure that the WTO rules do not encourage punitive actions like the Carbon Border Adjustment Mechanisms (CBAM) implemented by the EU to promote climate goals. Such actions will not only discourage exports from developing countries into the advanced countries but will also slow their progress towards their NDCs.

CBAM imposes a carbon tariff on imports into the EU based on the level of carbon emissions in the imported products, except those participating in the EU's Emission Trading System or a linked mechanism. The OECD (2019) has identified seven high carbon emitting industries, namely, mining and extraction of energy and related products; textiles, wearing apparel, leather and related products; chemicals and non-metallic mineral products; basic metals and fabricated metal products; computers, electronic and electrical equipment; machinery and equipment; and motor vehicles, trailers and semi-trailers. Most of the products of these industries are of export interest to the developing countries. Such initiatives can adversely impact exports from developing countries and further curtail the financial resources they have available for adaptation.

While any tariffs imposed on the imports of these products will have adverse implications for the foreign exchange earnings of developing countries, this may not have any significant impact on global emissions. UNCTAD (2021)[21] estimates that CBAM will reduce global carbon emissions by not more than 0.1% but will decrease global real income by $3.4 billion, with developed countries income rising by $2.5 billion while developing countries' incomes fall by $5.9 billion.

[20] TN/TE/W/79

[21] https://unctad.org/system/files/official-document/osginf2021d2_en.pdf

Instead, an incentive-based approach at the WTO can tremendously help developing countries to achieve environmentally sustainable structural transformation. For example, in terms of addressing plastic pollution as a way of eventually reducing global plastics trade, developing countries can contribute in a significant manner by proposing incentivizing trade of environmentally sustainable substitutes of plastics. These includes jute, glass, pottery and ceramic, natural fibers, paper and cardboard, rice husks and organic wastes, milk protein and natural rubber. These non-plastics (substitutes) are highly traded and also represent key exports for developing countries, generating important employment and livelihood opportunities, especially for women.

A shift towards these non-fossil fuels-based substitutes can become an important element of green industrial policies. Incentives like "Zero Tariffs on Plastic Substitutes" at the WTO can be an extremely useful positive agenda for the developing countries to take forward. Such action will encourage these alternatives and substitutes to plastic to become a "sunrise" area where some developing countries are already trying to create a competitive edge.

Developing countries can also play an important role in encouraging green transition and diverting inefficient subsidies from fossil fuels towards renewable energy to simultaneously increase affordable energy access and decrease emissions. Instead of punitive measures at the WTO, positive incentives can be proposed. Key green technologies can be shared between developed and developing members for redirecting production methods from fossil fuel use to clean energy, and financing and capacity-building support should be provided to developing countries for leaving their territorial fossil fuels in the ground. To make any of this a reality, developing countries need to coordinate their positions on such a positive trade and environment agenda at the WTO and across multilateral arena.

6. Lessons from developed countries on Climate Adaptation Strategies

Climate change is posing an existential threat not just for developing countries but also to the developed world. It has already played a crucial role in Europe, with the mean temperature increasing and extreme weather events becoming more recurrent. The average temperature of the European land area was 1.3°C[22] higher from 2002 to 2011 than before the industrial revolution. European countries like Italy, Portugal and Greece have found themselves in the throes of historic heatwaves this year, leading to several record-breaking wildfires.

However, unlike developing countries, developed countries have embarked on well-planned strategies at both national and regional level. This section shares some of the key lessons from the EU Adaptation Strategy which can help developing countries to learn and develop their own regional-level climate adaptation strategies.

6.1 EU Strategy on Adaptation on Climate Change

In February 2021, as a part of the Green Deal[23], the European Commission (an executive of the EU) adopted a new, more ambitious EU Strategy on Adaptation on Climate Change. Adaptation to climate change is increasingly acknowledged by the EU as a vital pillar of the climate policy, aimed at assisting communities in managing and adapting to the negative effects of climate change on water resources, biodiversity, agriculture and forestry, energy supply, health and insurance industry and industrial and urban infrastructure.[24]

[22] https://www.eea.europa.eu/data-and-maps/indicators/global-and-european-temperature/global-and-european-temperature-assessment 5#:~:text=The%20average%20temperature%20for%20the,during%20the%2021st%20century.

[23] The European Green Deal aims to make Europe climate neutral by 2050.

[24] Questions have been raised about a lack of concrete, measurable and time-bound targets in the Strategy for the EU and Member States to become climate resilient, see https://eeb.org/wp-content/uploads/2021/02/EEB_First-Assessment-2021-Adaptation-Strategy_24-Feb-2021.pdf

Building on the 2013 Climate Change Adaptation Strategy which outlined three main objectives - promoting action by the Member States; promoting better-informed decision-making; and promoting adaptation in key vulnerable sectors – the new strategy outlines long-term visions for the EU to become a climate-resilient society that is fully adapted to the inevitable impacts of climate change by 2050[25]. This means that by 2050, the EU aims to have reached climate neutrality, reinforced adaptive capacity and minimized vulnerability to climate impacts, in line with the Paris Agreement[26] and the proposed European Climate Law.[27]

The new proposal also directs the focus from cognizing the problem toward finding and implementing concrete solutions. The strategy, therefore, focuses on the following paramount objectives: to make European adaptation "*smarter, faster and more systemic*", minimizing the risk of negative spill overs from climate impacts outside of Europe, and boosting international climate adaptation.

Smarter adaptation refers to further expanding the knowledge and data necessary to make informed adaptation choices. Faster adaptation is required because adaptation continues to be a secondary priority for some governments who have found themselves unprepared for climactic shocks. There is also a lack of public and private sector investment in concrete adaptation solutions. The Commission, therefore, wants to speed up the rollout of innovative initiatives, including with EU funding, to improve and monitor insurance coverage, and notably to improve the management of fresh water and reduce water use. Overall, the proposed actions focus on developing guidance, standards and best practices, supporting (sub)national policy development, and integrating adaptation into a few regulations, such as the EU's classification of what constitutes 'green' investment.

More systemic adaptation means, among other things, supporting the improvement of adaptation plans by stimulating cooperation between regions and countries and creating a harmonized framework for monitoring, reporting and evaluating progress on adaptation. It also means considering social aspects of adaptation, such as reskilling workers and protecting them from climate impacts. Climate change resilience is to be integrated into national fiscal frameworks and EU fiscal governance. Finally, systemic adaptation entails the Commission encouraging the use of nature-based adaptation solutions, such as urban green spaces or green roofs.

Additionally, the EU articulates a plan to work on three levels to advance adaptation:

- To ensures that all its policies and actions work towards increasing Europe's resilience to the impacts of climate change.
- To support national, regional and local authorities and their partners in the private sector to adapt to climate change.
- Globally, to support international climate resilience and preparedness by advancing international finance and stimulating more robust global engagement and exchanges on adaptation[28].

6.2 Cooperation amongst EU Countries on Climate Agenda

One of the key lessons that emerges from the EU's climate adaptation strategy is implementation at the country level which is further boosted by cooperation and coordination amongst EU member states. The 2021 European Climate Law (Regulation (EU) 2021/1119) explicitly calls for EU member states to progress on adaptation. It contains provisions about mandatory adaptation strategies, assessments of progress, consistency of adaptation measures and adaptation mainstreaming. Member states thus share the responsibility for adapting to climate change and consequently, action at the national level is

[25] https://www.europarc.org/news/2021/02/a-new-eu-strategy-on-climate-change-adaptation/

[26] Paris Accords or the Paris Climate Accords is an international treaty on climate change, adopted in 2015 covering climate change mitigation, adaptation, and finance.

[27] European Climate Law COM/2020/80 final

[28] https://ec.europa.eu/clima/eu-action/adaptation-climate-change_en

supported by cooperation amongst member states. For example, Germany and France have launched a joint research programme as a contribution to executing the Paris Agreement. The fellowship, part of the French '*Make Our Planet Great Again'* initiative calls for climate, energy and earth system scientists worldwide to take part in research in the two countries. The main objectives of the program are as follows:

a. To enable international researchers to do top-level research on the objectives of the Paris Climate Agreement at German institutions.

b. To contribute to sustainable networking among the researchers and thus boost international research in climate change, energy transition and earth system research (French-German conferences and local meetings).

c. To assist policymakers in their climate-related decisions by delivering application-oriented and innovative new research results.

d. To provide an impulse at an international level to assume responsibility for global developments which require an immediate need for action.

e. To enhance German and French universities and research institutions and to deepen the collaboration between Germany and France in the area of science.

Other examples of cooperation amongst the member states include the working group on "Adaptation to climate change"[29], which aims to create synergies between Belgium, the Netherlands and Luxembourg. In April 2022, Belgium and the Netherlands vowed to strengthen their collaboration and cooperation in security, energy, and climate areas. Members also cooperate through the Green Growth Group, which is an informal group of climate ministers from 16 EU Member States (Ireland, Germany, France, Italy, Belgium, Portugal, Sweden, Denmark, Finland, Slovenia, Estonia, Luxembourg and the Netherlands, Austria), the UK and Norway. The Group works together to explore, promote and pursue a cost-effective and growth-enhancing low carbon agenda and a constructive, determined and effective EU contribution to the international climate negotiations. Amongst others, the Group works on formulating and communicating joint positions, liaises with European institutions, and establishes a platform for discussion with stakeholders and sustainable business leaders.

6.3 Climate Adaptation through Digital Transformation

Digital transformation is also being used by EU member states for progressing climate goals. The growing threat of climate change and the need for digital transformation has resulted in France and Sweden signing a strategic partnership for innovation, digital transformation and green solutions in 2017[30]. Both countries have committed to combat climate change using digital technologies and their areas of cooperation include green transport solutions, smart cities, clean energy, and green financing for climate-resilient economies. The partnership is based on the innovative capacity of public sector, business sector, stakeholders, and academia, and covers four areas[31]:

- green solutions for transport, clean energy and smart cities,
- green financing for climate-resilient economies,
- digital transformation, smart industries and startups, and
- health and life sciences innovation

[29] https://www.adapt2climate.be/benelux/?lang=en

[30] https://www.drivesweden.net/en/internationalization#:~:text=In%20November%202017%20Swedish%20Prime,to%20drive%20this%20collaboration%20forward.

[31] French-Swedish cooperation for a more innovative and greener EU

6.4 Cooperation for Climate Adaptation in Nordic Countries

The Nordic countries have also for several years organised common activities at the COP climate negotiations under the aegis of the Nordic Council of Ministers, an intergovernmental forum set up after the Helsinki Treaty. The Nordic Council of Ministers has no formal role in the climate negotiations, but through its institutions and working groups, it supports the search for future climate solutions and contributes to the climate agenda. The Nordic countries have ambitious plans on becoming fossil free, and the Nordic Ministers for the Environment and Energy & Climate have committed to pursuing strong leadership in climate efforts, despite Norway's obvious outlier position as a major fossil fuel exporter. They are braced by the Nordic Prime Ministers, who have laid down green transition as a consequential theme in their initiative Nordic Solutions to Global Challenges.[32]

The Nordic countries' progressive climate and energy policies have been outlined on the basis that well-organised efforts to reduce greenhouse gas emissions can mitigate climate change while also fostering sustainable economic growth and employment. This decoupling of emissions from economic growth has already commenced in the Nordic region. Nordic CO_2 emissions per unit of electricity produced were one fifth of the global average in 2016, while total GDP in the same year grew by 2.2% to EUR 1,073 billion[33]. Ambitious emission reduction targets have also been set for future decades, with each country defining ambitious targets and visions for 2050.

In the Green Technology front, Nordic national policies have diligently promoted R&D investments related to energy-saving technologies and clean energy sources. The Nordic countries have agreed to advance the spread of climate-friendly best available techniques. Their governments focus on supporting green technologies by invigorating public sector purchasers to serve as role models and help to build markets by recommending low-carbon options in areas such as buildings, transports and catering. Furthermore, the Nordic countries and their shared financing institutions like the and the Nordic Development Fund (NDF) and Nordic Environment Finance Corporation (NEFCO) are at the same time continuing to identify and assist the implementation of climate-friendly renewable energy and energy saving schemes in developing countries both at the regional level (NEFCO) and beyond (NDF)[34].

The 2013–2018 Environmental Action Plan of the Nordic Council of Ministers focussed on reducing greenhouse gas emissions to help attain the goal of regulating global warming to an average of less than 2 °C[35], and thus restricting the consequent socioeconomic and environmental impacts. The action plan highlights the need to support innovative funding mechanisms such as the Green Climate Fund[36], as well as market-based mechanisms that can revitalize cost-effective emission reductions. There have been critiques that such policies could result in "carbon leakage" in the private sector, if industries chose to shift location to countries with less rigorous climate and energy policies; but the continued strong economic performance of the Nordic countries indicates that their progressive policies have not tarnished business or welfare.

In addition to cognizing with their national strategies and measures, the Nordic countries also pool their resources to tackle climate change through several joint Nordic initiatives such as:

- The Nordic Council of Ministers (NCM) – NCM is the official inter-governmental body overseeing Nordic cooperation. Climate issues are prominent in the Nordic prime ministers' initiative called "Nordic Solutions to Global Challenges", which is realised by the NCM.
- The Nordic Environment Finance Corporation (NEFCO), an international finance institution

[32] https://medium.com/wedonthavetime/decleration-on-nordic-carbon-neutrality-898be0a9722e

[33] https://www.nib.int/cases/nordic-action-on-climate-change-towards-carbon-neutral-economy

[34] https://www.nordicclimatefacility.com/documents/ncf_2015_annual_review_nefco_final.pdf

[35] http://norden.diva-portal.org/smash/get/diva2:701437/FULLTEXT01.pdf

[36] A fund established within the framework of the UNFCCC as an operating entity of the Financial Mechanism to assist developing countries in adaptation and mitigation practices to counter climate change

comes with more than 25 years of experience in financing projects outside the Nordic region, but with positive climate/environmental impacts for the Nordic countries and beyond. NEFCO's green financing focuses on small and medium-sized private and public projects (SMPs)[37] with demonstration value. Today, an essential part of NEFCO's green financing targets public energy efficiency projects and the internationalisation of Nordic companies within the environmental sector. Both of these activities triggers at the same time climate/environmental benefits and positive economic returns to the municipalities and the firms involved, allowing them to grow and create new sustainable investments

- The Nordic Development Fund (NDF) which is the joint Nordic international finance institution (IFI) focusing on the nexus between climate change and development in lower-income countries and countries in fragile situations[38]. NDF provides funds to help low-income countries in Asia, Africa and Latin America. These funds are used for climate mitigation and adaptation activities, usually through co-financing cooperation with multilateral development banks (MDBs) and other financial institutions.
- The Nordic Investment Bank (NIB), an international financial institution founded in 1975 another international financial institution that supports the development of a low-carbon economy through financing sustainable Nordic and Baltic Projects is owned jointly by the Nordic and Baltic countries. NIB provides long-term loans to private and public sector partners in these two regions for projects favouring competitiveness and the environment[39]. NIB has also financed energy efficient infrastructure and public transport schemes, including improvements to rail transport systems in Lithuania, Latvia, Finland and Sweden.

7. Core Principles of South-South Cooperation for Climate Adaptation

Learning from the advanced countries' experiences and initiatives on climate adaptation, developing countries also need to initiate a strategic cooperation and integration plan for building resilience to climate challenges.

Given the severity of climate challenges facing the Global South, developing countries will have to adopt an ambitious agenda under South-South cooperation and economic integration for climate adaptation. This climate adaptation agenda can be based on four mutually reinforcing core principles, which are:

a. Prioritizing climate adaptation in broader economic development agenda;

b. Adopting a systemic approach to climate adaptation;

c. Providing mutual support with concrete action for building financial and technical capacities for climate adaptation; and

d. Shaping international agenda on climate adaptation with solidarity and coordination.

7.1 Prioritizing climate adaptation in broader economic development agenda

Decoupling economic growth from energy use is a tough challenge for developing countries, especially given their technological, financial, and capacity gaps. With the unavoidable rising surface temperature, mitigation measures alone will not be sufficient to reduce the risk and damages caused by climate change. There is an urgent need for developing countries to prioritize boosting climate adaptive capacity and minimizing vulnerability to climate impacts alongside economic development to achieve sustainable

[37] https://www.nefco.int/financing-options/#financingoptions

[38] https://www.ndf.int/who-we-are/about-us.html

[39] https://www.nib.int/what-we-offer/loans

development. At the national level, this will require putting climate adaptation at the centre of development plans for informed decision making. Climate adaptation also needs to be integrated into national fiscal and regional financial cooperation frameworks. At the regional level, climate adaptation should be prioritized in the overall South-South cooperation agenda. For instance, regional integration strategies in the South need to aim not just at regional growth and development but also at building resilience to climate change.

7.2 Adopting a systemic approach to climate adaptation

There is a need for incorporating a more systemic approach to climate adaptation rather than ad hoc policies in the Global South. This approach should be cross-regional, cross-country, and cross-sectoral. A comprehensive regional climate adaptation strategy needs to be designed to support and complement country-level climate adaptation plans while using an inter-sectoral coordinated approach towards macroeconomic, financial, trade and industrial policies. Stimulating cooperation for climate adaptation among developing countries can build capacities for reducing vulnerabilities to climate change. A harmonised framework, which incorporates various interrelated actions areas including social, financial, technological amongst others, should be developed to this end. Social aspects of adaptation like providing social safety nets, reskilling workers, and protecting displaced populations can be built into this harmonised framework at the regional level, ensuring climate adaptation is integrated into national fiscal and regional financial cooperation frameworks.

7.3 Providing mutual support with concrete action for building financial and technical capacities for climate adaptation

While South-South cooperation cannot substitute North-South cooperation in resource mobilization for mitigating the impacts of climate change, it can play an important complementary role. Mutual support, especially in the areas of climate finance, climate research, capacity building, and green innovation and technological development can help boost developing countries' adaptive capacities. Mutual financial and technical support amongst the developing countries, especially within regions, can assist in overcoming challenges posed by climate impacts like fires, floods and drought which do not respect borders. South-South cooperation can be strengthened to support climate adaptation through concrete actions such as early warning systems, monitoring and evaluation mechanisms, biodiversity conservation, agriculture cooperation, and watershed management, etc.

7.4 Shaping international agenda on climate adaptation with solidarity and coordination

South-South cooperation can build solidarity among developing countries and play an important role in making their common voice stronger in international debates and negotiations. Considering their specific and shared vulnerabilities, countries in the Global South need to build solidarity and forge common positions in international fora. For example, in order to bridge the climate funding gap, developing countries need to work together to track, monitor and evaluate their financial and capacity building needs and ensure that the climate funding commitments of developed countries are met fully and in a timely manner. International action is also needed to facilitate patent free green technology transfers and increase capacity and the Global South needs to jointly push for these actions.

8. Agenda for South-South Cooperation for Climate Adaptation and Sustainable Development

Based on these core principles, we outline an actionable eight-point Agenda for South-South cooperation on Climate Adaptation. This agenda can be used to design action plans at the regional and sub-regional levels. The agenda comprises the following eight steps under 3 of the guiding principles noted earlier:

I. Collaboration on adaptation strategies

1. Mainstreaming climate adaptation in national and regional development agendas.
2. Injecting and allocating financial resources in regional development banks for supporting climate adaptation.
3. Building capacity for climate friendly digital transformation of the South.

II. Technology and knowledge sharing

4. Creating Green Patent-Free Technology Banks in the South.
5. Promoting regional climate risk assessment centres.
6 Setting up climate adaptation research networks in the Global South.
7. Establishing knowledge-sharing platforms on climate adaptation in the South

III. International coordination

8. Building South-South solidarity and common positions in climate negotiations in the UNFCCC and climate discussions at the WTO and other multilateral fora.

8.1 Mainstreaming climate adaptation in national and regional development agendas

The Global South has lagged the North in terms of setting up of an effective national and regional climate adaptation agenda. While there are some examples in the South at the regional level like the climate adaptation plans of the ASEAN, these are still at a very nascent stage. The current ASEAN institutional framework for climate change may have served the region well in the initial years but as the climate challenges become more cross-cutting and difficult, a revolutionary rethink of its current institutional framework is required on how best to build a coherent response to climate change. Much of the same can be said in the case of African and Latin American regional grouping.

Learning from the ongoing EU Adaptation Strategy, it is important for developing regions and countries to embark on green, low carbon and climate resilient development trajectories which requires mainstreaming their climate adaptation policies into their national and regional development plans. This would include green industrialization policies at the national level and greening value chains at the regional level. As discussed above, green industrialization requires achieving energy transition, resource security and low carbon agriculture and food security. Achieving these objectives require incorporating them into national and regional development plans, as sectoral policies may not be sufficient to address the associated challenges.

A cross-cutting and systemic shift is required including favorable legal frameworks, domestic capability formation, standard setting training, tax incentives and joint research programs. Incentives for the use of renewable energy needs to be designed at the national and regional level. Investments need to be channeled and promoted towards green solutions, clean energy, smart cities, digital startups for building climate-resilient regions. Regional cooperation and integration can go a long way in achieving these objectives for the South.

8.2 Injecting and allocating financial resources in regional development banks for supporting climate adaptation

Many regional development banks in the South are now in the process of designing their climate change policies, e.g., the Islamic Development Bank (IsDB) has a dedicated Climate Change Action Plan (2020-2025) which sets out how the Bank will achieve its climate finance target of 35% by 2025. It is also increasing its efforts to ensure that all its investment and lending operations integrate climate mitigation opportunities and adaptation measures in order to contribute to international climate goals.

The New Development Bank (NDB) of BRICS similarly seeks to promote mitigation and adaptation measures by supporting existing and new green economic growth initiatives at the regional, national and sub-national levels. The Bank also encourages climate proofing of its infrastructure financing and investments to build resilience to climate change. The Asian Infrastructure Investment Bank (AIIB) aims at aligning its operations with the goals of Paris Agreement by July 2023 and has targeted at least a 50% share of climate finance in actual financing approvals by 2025. Further, it is interesting to note that the Asian Development Bank and ASEAN member governments have established the ASEAN Catalytic Green Finance Facility to help countries prepare and finance green infrastructure projects. Along similar lines, the African Development Bank has prioritized mainstreaming climate change and green growth by committing to incorporate climate-informed designs into 100% of its investments.

While these plans of regional development banks may take time to show results with respect to building climate resilience in their member countries, it is important to boost their capacities by injecting new funds dedicated to climate adaptation and improving their expertise. The current funds in these banks dedicated to climate adaptation is only a fraction of what is needed to avoid costly and catastrophic future impacts.

There is a need to adopt a systemic approach towards climate adaptation. It is important that the South has well-financed green public and development banks, staffed by experts in climate change issues, at municipal, national and regional levels. The criteria to assess the credit worthiness of development banks needs to be relaxed from the AAA straitjacket to support experimental or new green technologies and enterprises. Enhancing cooperation among central banks, development banks and regulators in developing countries to share policies and good practice to address climate challenges in financial markets can also help.

There is a need to explore further other complementary initiatives to generate additional financial resources for building climate resilience. These could include immediate debt payment moratoria and debt cancellation for developing countries' sovereign debt; needed reforms in the global tax system; and pushing for a new allocation of SDRs to developing countries to support economic and energy diversification efforts and further climate actions (Trade and Development Report 2021).

8.3 Creating Green Patent-Free Technology Banks in the South

Access to green technologies is not only a key to climate mitigation but can also assist climate adaptation in developing countries. Green transition is costly and challenging in the face of limited access to green technologies. However, most of the innovations with respect to environment-friendly technologies are taking place in the developed world and are patented.

One argument used in favour of patents is that they promote technology transfers, however, according to UNCTAD (TDR 2021), intellectual property rights (IPRs) have not led to green technology transfers to developing countries. Patent protection has in fact had potentially negative consequences for subsequent innovation that builds on the protected technologies.

Patents are mainly provided to compensate the innovators for their risky private investments in research and innovations. However, many of the emerging green technologies in the North are developed with the support of public financing because of the social and ecological imperative of climate action, with limited risk undertaken directly by investors. This imperative should extend to international cooperation, with such technologies enshrined as global public goods.

In lieu of such a global initiative and following the core principle of providing mutual support for building technical and financial capacities, developing countries can pool resources at the regional level to create Green Technology Banks, where identified patent-free green technologies and new technologies innovated through new south-south research partnerships can be made available as public goods. These technologies like solar power are cheaper to deploy than fossil fuels in many countries and can greatly assist developing countries to progress on their NDCs.

8.4 Building capacity for climate friendly digital transformation of the South.

Digital technologies are generally thought to be environment friendly e.g., they help in reducing the carbon emissions related to travel, however, according to UNEP (2021b)[40] digital technologies also have huge carbon footprints, accounting for almost 3.7 per cent of all GHG emissions, which is comparable to aviation industry emission levels. Further, the data centres also contribute significantly to GHG emissions, 60 per cent of which are caused by IT components such as servers, storage systems and networks and the rest are due to infrastructure needed for cooling and air conditioning the data centres and providing them with power supply. The growing use of online activities and clouds also contribute significantly to global carbon emissions. For example, the average CO_2 consumption of streamed online video is more than 300 million tons per year, the equivalent of Spain's annual emissions.[41]

Given the global digital divide, developing countries are latecomers to digital technologies and can benefit from the latest innovations with respect to green digitalization. A South-South digital cooperation agenda (as proposed by UNCTAD, 2018), can help in building awareness and promoting access to green digital technologies and other such policies and initiatives which addresses this issue. Learning from the advanced economies can also help, e.g., twenty-six EU countries plus Norway and Iceland have signed an EU declaration committing to leading the green digital transformation by deploying and investing more in green digital technologies to achieve climate neutrality.[42] Such initiatives can provide guidance to the global south in the process of their digital transformation.

8.5 Promoting regional climate risk assessment centres.

Climate change continues to pose serious interlinked risks to natural, social and economic systems in all regions of the world, challenging the resilience and adaptation capacities across regions. Changes in temperature, weather systems, coastal zones, biodiversity and GHG emissions need to be continuously monitored and predicted to adjust climate adaptation policies. This is a daunting challenge facing the Global South. Vulnerabilities of ecosystems and people to climate change differ substantially among and within regions and reacting to them in time requires consistent monitoring of the risks for informed decision making. There is a need for the global south to develop a common framework for the regular and consistent assessment and monitoring of climate risk and the associated impacts. This can help developing countries in better preparing themselves for future calamities.

At the regional level, UNFCCC has set up six Regional Collaboration Centres (RCC) to support implementation of countries' NDCs in the region, namely RCC Bangkok – Asia and the Pacific; RCC for Middle East, North Africa and South Asia; RCC Kampala – Eastern and Southern Africa; RCC Lomé – Western and Francophone Africa; RCC St. George's – Caribbean; and RCC Panama – Latin America. These centers are important institutions which could be strengthened further so that they provide regular, detailed, regional risk assessment reports using a common framework and assist in preparing joint action plans at the regional level to help in climate adaptation strategies of their member states. These could also help countries in assessing loss and damage in the aftermath of climate calamities for securing international support. By providing mutual support, these RCCs can better prepare the global south for future climate changes.

[40] https://wedocs.unep.org/bitstream/handle/20.500.11822/37439/FB027.pdf

[41] https://theshiftproject.org/wp-content/uploads/2019/03/Lean-ICT-Report_The-Shift-Project_2019.pdf

[42] https://digital-strategy.ec.europa.eu/en/news/eu-countries-commit-leading-green-digital-transformation

8.6 Setting up climate adaptation research networks in the Global South.

The Global South can greatly benefit by building a network among universities, laboratories and research entities in the South to strengthen their green technological capabilities and facilitate the transfer and sharing of green technologies amongst themselves. Learning from the mutual support provided by Germany and France, as discussed above, developing countries can set sustainable networking among their researchers, both within the regions and between the regions, to boost research on climate mitigation and adaptation, energy transition and green digital transformation.

Such joint research proposals could also assist policy makers in the South in their climate-related decisions by direct application to policy solutions. Taking into account the foreseen climate-related risks, joint research can be initiated at the regional level by pooling human and financial resources to arrive at viable, locally driven approaches. Mutual support is the key to reducing climate-related vulnerabilities in the regions of the South.

8.7 Establishing knowledge-sharing platforms on climate adaptation in the South

Apart from collaborative climate adaptation research, knowledge sharing platforms can provide the much-needed assistance to policymakers in designing climate adaptation policies. Sharing experiences related to climate change and climate adaptation can build South-South solidarity and help developing countries in identifying common challenges and solutions. For example, climate challenges faced by small island developing states (SIDS) in Caribbean and the Pacific are similar and from time to time simultaneous. These countries can build on each other's experiences of climate adaptation to identify policies that work and those which do not. Sharing implementation challenges of climate adaptation plans can also help in shaping better responses at the national level. Such knowledge sharing platform can be launched at the inter-regional level for providing stronger mutual support.

8.8 Building South-South solidarity and common positions in climate negotiations in the UNFCCC and climate discussions at the WTO and other multilateral fora

Developing countries need to work together and have identified common concerns, interests and positions in international platforms dealing with climate change issues. Two such multilateral bodies are UNFCCC and the WTO. As discussed above, in both UNFCCC and the WTO, developing countries need to emphasize their need for 'common but differentiated responsibilities' and 'special and differential treatment,' respectively.

In COP26, under the 'Glasgow Climate Pact' countries pledged to double adaptation finance and strengthen efforts to build resilience to climate change. Developed nations have reaffirmed their duty to fulfill the pledge of providing 100 billion dollars annually to developing countries. And countries have collectively agreed to work to reduce the gap between existing emission reduction plans and what is required to reduce emissions, so that the rise in the global average temperature can be limited to 1.5 degrees thus helping to limit adaptation needs.

Unlike in the UNFCCC where the commitments undertaken by countries are not legally binding, in the WTO agreements and decisions have legal implications. It therefore becomes extremely important for developing countries to build South-South solidarity to identify common areas of interest and concerns in the climate discussions taking place in the WTO. As discussed above, it is important for developing countries to adopt a positive trade and environment agenda which incentivizes countries to trade in environment-friendly goods where they have comparative advantage like plastic substitutes and discourage unilateral actions like the CBAM which can adversely impact the exports of developing countries further limiting their fiscal space to deal with climate vulnerabilities.

Clean transition is costly and requires advanced technologies and finance. Working together, developing countries can propose a trade and Environment Fund in the WTO in addition to climate finance in order to compensate them for their green transition. A climate waiver can also be proposed which will allow the

members to design their national policies to encourage development of green technologies without the risk of triggering disputes against them. Developing countries can also insist on declaring identified green technologies as 'public goods' and facilitating patent-free green technology transfers. Expanding TRIPS flexibilities in relation to environment-friendly goods and services can also help developing countries in progressing their NDCs.

Conclusions

Climate change is of the most critical crises facing the world today. While comprehensive climate mitigation and adaptation policies are being implemented by developed countries both at the national and regional levels, developing countries are lagging in terms of developing an integrated, south-south cooperation agenda for climate adaptation and sustainable development.

This paper identifies four mutually reinforcing core principles on which South-South cooperation for climate adaptation can be based and proposes an eight-point actionable agenda. The core principles identified are prioritizing climate adaptation in the broader economic development agenda; adopting a systemic approach to climate adaptation; providing mutual support with concrete action for building financial and technical capacities for climate adaptation; and shaping the international agenda on climate adaptation with solidarity and coordination.

Based on these mutually reinforcing core principles, the eight point agenda includes: mainstreaming climate adaptation in national and regional development agendas; injecting and allocating financial resources in regional development banks for supporting climate adaptation; creating Green Patent-Free Technology Banks in the South; building capacity for climate friendly digital transformation of the South; promoting regional climate risk assessment centres; developing climate adaptation research networks in the Global South; establishing knowledge-sharing platforms on climate adaptation in the South; and building South-South solidarity and common positions in climate negotiations in the UNFCCC and climate discussions at the WTO and other multilateral fora.

To implement this agenda, which addresses an ever-evolving adaptation challenge for developing countries to build resilience to future climate impacts, there is a need to find systemic solutions which are institutionalised in national and regional climate adaptation plans of the Global South. One such solution can be to set up an inter-regional Secretariat within the UN system in the Global South with the mandate of boosting South-South cooperation on climate adaptation and sustainable development. This institution could provide a common platform to the Regional Collaboration Centres, set up by the UNFCCC, to work together so that regional climate adaptation plans complementing national plans can find mutual support.

Given the dynamic nature of climate change, it may be important for this institution on South-South climate Adaptation to organise an Annual Ministerial Forum on Climate Adaptation and Sustainable Development. This Forum could help in designing a systemic, evolving and workable agenda for climate adaptation and sustainable development in the South, which is mutually supported by the developing countries and helps in identifying and forming common positions in international platforms.

The Global South will continue to need international support to bridge its funding, technological and institutional gaps in order to progress on climate goals. But as this paper explains, this international support must be complemented by national and regional ambition. South-south cooperation and economic integration can help in building climate resilience and south-south solidarity and coordination is needed for forming common positions on international climate debates and negotiations. For the South to address the ever-evolving climate challenge and build its adaptive capacities, all avenues must be pursued.

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