The least developed countries report 2024

Chapter IV

Carbon markets and their implications for domestic policies and institutions

United Nations

This chapter examines how the least developed countries (LDCs) can mobilize their institutions to implement Article 6, paragraphs 2, 4 and 8 of the Paris Agreement. Carbon markets are complex, and the international architecture implied by the Agreement is a challenge for countries that have not yet developed the domestic policies and capacities necessary for their implementation. Improving institutional quality, formulating flexible and adaptative policy frameworks and developing the appropriate skills and capabilities in LDCs will be essential in leveraging Article 6 mechanisms under the Agreement. To this end, LDCs should take advantage of the facilitations offered through various mechanisms of the Agreement, assess their readiness for implementation and address gaps in policies, institutions, regulations, finance, technology and infrastructure.

A. Introduction

The Paris Agreement is a complex international agreement on climate change that has not only expanded the global ambition on greenhouse gas (GHG) mitigation targets, but also increased States' roles and functions geared to implementing the treaty (Bernstein and Hoffmann, 2018; Allan et al., 2023). It requires countries to play a more active role in voluntary cooperation involving internationally transferred mitigation outcomes (Article 6, paragraph 2), as well as in international carbon trading under the supervision of an international oversight body (Article 6, paragraph 4). Voluntary cooperation among countries extends to non-market approaches that are critical for upscaling the means of implementing mitigation and adaptation actions, including the provision of support in terms of finance, technology transfer and capacity-building among Parties (Article 6, paragraph 8).

As noted in chapter II, carbon markets fall into two categories: government-regulated schemes (compliance markets) that operate by setting limits on total emissions and issuing tradable permits to regulated entities; and self-regulating voluntary markets in which private actors purchase carbon credits for the purpose of meeting voluntary mitigation commitments. Under certain conditions, voluntary carbon markets may overlap with compliance markets that accept credits from voluntary schemes. The two market structures entail different costs for emitters depending on government policy. A compliance market implies that the Government takes direct control of emissions of regulated entities, whereas private actors shape the operational frameworks in voluntary markets. Since the Clean Development Mechanism of the Kyoto Protocol, LDCs have participated in carbon trading mainly through voluntary carbon markets as suppliers of carbon credits (chapter III).

This chapter examines how LDCs can mobilize their institutions to implement Article 6, paragraphs 2, 4 and 8 of the Paris Agreement. The chapter reviews the institutional landscape in LDCs vis-à-vis the organizational requirements of carbon trading in either compliance or voluntary markets, or voluntary

cooperative mechanisms proposed in Article 6, paragraphs 2 and 8 of the Agreement. The central question is the extent to which LDCs have the institutions and capacities required to allow them to benefit from Article 6 mechanisms.

The rest of the chapter is organized as follows. Section B first discusses the fundamental role of institutions in policy formulation as it relates to carbon markets. It then explains the mechanisms through which institutions can influence climate action through carbon markets. Section C discusses the institutional arrangements at the global level, as envisaged in Article 6 of the Paris Agreement, and the rules, modalities and procedures established by the Conference of the Parties (COP) serving as the meeting of the Parties to the Paris Agreement (CMA). It also discusses their implications for institutional development in LDCs that are actively seeking to participate in the Article 6 mechanisms. Section D concludes by discussing the challenges and opportunities for LDCs in implementing Article 6. It focuses on the institutional and regulatory capacities of LDCs for carbon trading, and offers insights into possible strategies that LDCs could deploy in response to the ongoing CMA negotiations on the implementation of Article 6. It also highlights non-market approaches (Article 6, paragraph 8) and how LDCs could leverage additional international support to engage more effectively in Article 6 mechanisms.

B. Institutions and carbon markets

Institutions are key to delivering strong, responsive climate action and inclusive development, matched by tangible progress on internationally agreed goals such as the 2030 Agenda for Sustainable Development and the Doha Programme of Action for the Least Developed Countries for the Decade 2022–2031. The Paris Agreement represents a direct call on States, regardless of any financial or institutional capacity limitations, to play wider and far-reaching roles in global carbon mitigation. It is assumed that Parties to the Agreement have strong policies, quality regulatory frameworks, skilled human resources, and effective and robust institutions with the capacities to coordinate various government ministries, agencies and other stakeholders in implementing the Agreement.

This section discusses the fundamental role of the State in policy formulation as it relates to carbon markets, and how this role could be used to influence climate action. It analyses institutional approaches at the national, regional and global levels to draw lessons from various carbon market models.

1. The context and market roles

The link between economic activities that drive emissions and the layers of bureaucratic systems that exercise State functions to control their domestic and transboundary impacts creates a complex set of demands on State institutions and non-State stakeholders. Carbon markets were primarily conceived as governance mechanisms to control emissions, but the emergence of voluntary standards and carbon crediting schemes operating outside compliance systems has changed their institutional dynamics, including their design and how they operate. The different designs have different implications for policies and institutions. Moreover, the dynamic relationships of the various actors in carbon markets have different effects on the environment, and on the distribution of costs and benefits to the public. These differences have important implications for environmental integrity and for public policy effectiveness, as explained below.

Institutions are the means by which societies operate, including the rules governing how transactions are conducted between individuals, groups and the State (Dovers and Hezri, 2010). Institutions may also imply all factors that govern the performance of an economy, including the political, educational, cultural and legal systems that ensure equity and the protection of human rights (including the right to property) (Coase, 2004). In this sense, they are systems that structure social interactions to make them predictable by constraining and enabling certain behaviours (Hodgson, 2006). Given that human beings are at the centre of societal interactions, institutions set the rules that govern and shape those interactions, whether social, political or economic (Lin and Nugent, 1995). By focusing on roles and functions, institutions refer to high-level national, regional and global entities that are mandated to facilitate government efforts in a particular policy direction. They are policymaking and regulatory entities that coordinate government engagement with stakeholders, to galvanize support for government actions with regard to specific development themes. The governance of climate mitigation policies, for instance, needs wider participation and support from stakeholders because of the trade-offs that may render policy reforms moot if stakeholders are opposed to the economic, social and environmental implications of environmental policies.

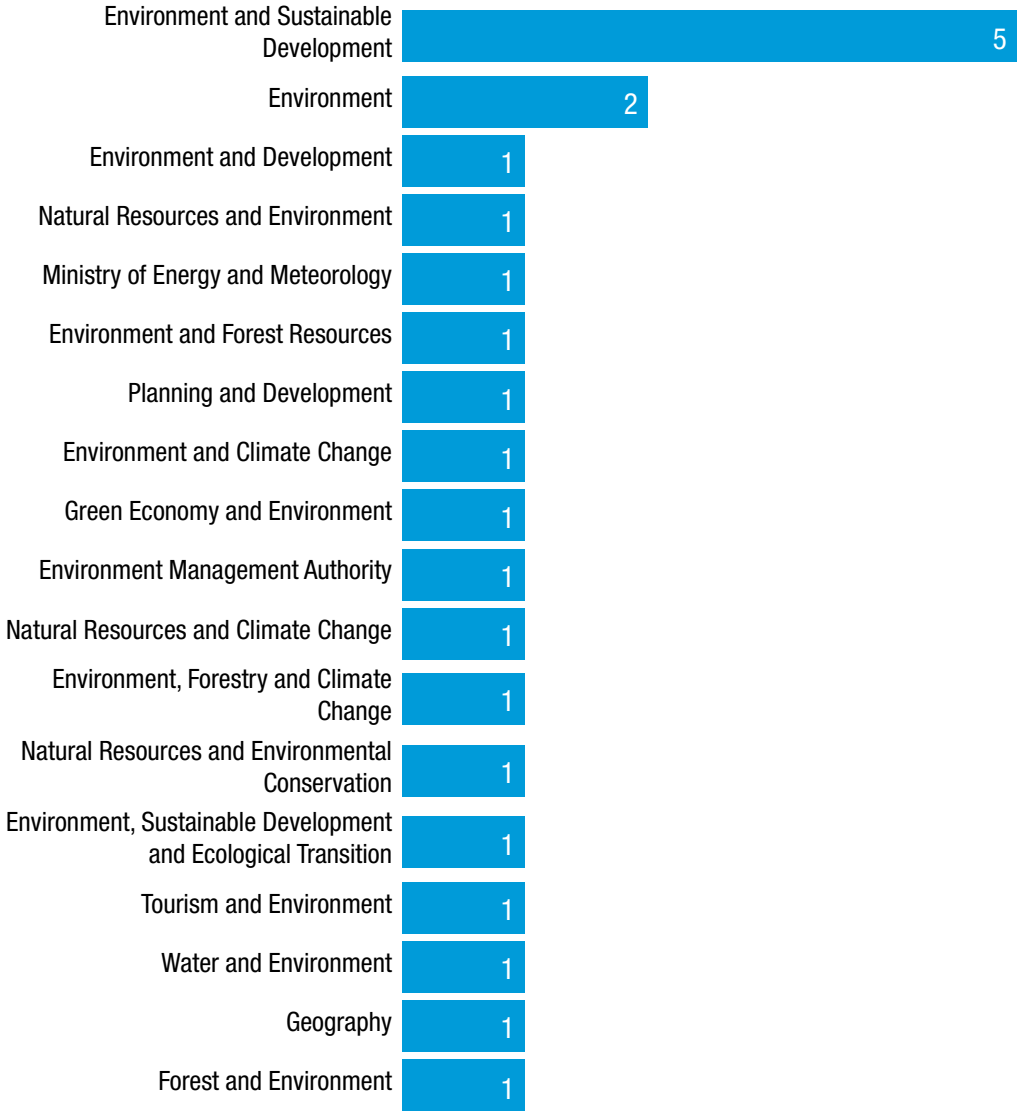
Mandates and purpose are key to the sustenance of institutions, particularly those that play coordinating roles across various functions of government. Climate change as a cross-cutting developmental issue requires an integrated approach for deepening intersectoral collaboration and minimizing trade-offs, to ensure coherence and consistency among sectoral policies, particularly those anchoring national sustainable development priorities (United Nations, 2015a). The Paris Agreement has a host of institutional arrangements for each mechanism it proposes, including under Article 6. The reporting arrangements under Article 6.4 (the Paris Agreement crediting mechanism) require a designated national authority that communicates with the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) and the Article 6.4 Supervisory Body on approved activities[1] with regard to the sectors in which approved activities will be carried out and the GHG accounting methodology, including baseline approaches and crediting periods under the mechanism. An analysis of the designated national authorities submitted to the UNFCCC secretariat by 23 LDCs as of May 2024 shows that 19 have designated the ministries in charge of the environment as the national authority (figure IV.1). The role of the designated national authority in domestic policy formulation and implementation is critical to implementation of the Paris Agreement. That authority is also best placed to assess and recommend nationwide capacity needs for implementing national priorities, as well as actions in fulfilment of the country's obligations under the Agreement. Therefore, it should not only be involved with the ministry in charge of the environment, but also with the finance, trade and planning ministries.

Markets are unlikely to be concerned with the reduction of GHG emissions without government interventions aimed at correcting the externalities associated with anthropogenic emissions (MacKenzie, 2009). Dedicated government entities are required to mobilize market-based tools and instruments necessary to control market failures, such as localized pollution, and global-level issues such as emissions. As explained in chapter II, there are two main ways in which carbon market institutions are formed. The first is through State regulation, whereby the Government builds and operationalizes a compliance carbon market through a policy and regulatory framework. The second is through social institutions,

How carbon markets fulfill their original role – a mechanism to control GHG emissions – depends on the institutions that regulate them

[1] The international carbon crediting mechanism under Article 6.4 is placed under the Supervisory Body, currently composed of 12 members from among the Parties to the Paris Agreement.

Figure IV.1
Most countries cited their ministry in charge of the Environment and Sustainable Development as their designated national authority



Source: UNCTAD secretariat calculations, based on data from UNFCCC, available at https://unfccc.int/process-and-meetings/the-paris-agreement/article-64-mechanism/national-authorities (accessed May 2024).

including public and private organizations that form coalitions on the common aims of reducing emissions and maximizing positive sustainable development impacts from environmental projects (Knox-Hayes, 2009, 2010). The two carbon market models present different organizational complexities and risks, and the trade-offs could be significant for developing countries that have little experience with market-based policy instruments for addressing climate change.

The next two subsections discuss the implications of the various carbon market models for institutional development. In a compliance market (subsection 2), the carbon market institution is a regulations-oriented social construction that exercises control over societal emissions. Attention is paid to policy design, the institutional landscape and the rules and regulations that are critical to achieving the objective of the State in reducing carbon emissions.

On the other side are the independent standards of non-governmental organizations (NGOs) and private sector institutions that administer voluntary carbon markets (subsection 3). In some limited cases, transactions in voluntary markets overlap with national or regional regulatory frameworks. However, a large share of the transactions in voluntary markets is conducted through self-regulation. These markets tend to have more transactions because their orientation is more relational or symbolic, based on fluid partnerships between stakeholders, and they emphasize the development of standards in mitigating emissions. The emergence of fragmented independent standards is a feature of these markets (Hamilton et al., 2008).

2. Compliance carbon markets

Data to June 2024 show that LDCs have not yet implemented compliance carbon markets. Some LDCs have introduced measures that may eventually lead to the broader application of market-based policy instruments on carbon emissions. For example, Senegal assessed the feasibility of carbon pricing in 2018, but consultations with stakeholders showed the need for further studies in the design of carbon taxes. In Bangladesh, the long-term development plan, Mujib Climate Prosperity Plan Decade 2030, was scheduled to introduce carbon pricing and tax dividends in 2024. These measures should complement two initiatives already launched in Bangladesh in 2022 under the long-term plan: a green exports programme and a national carbon finance coordination hub. Further, the country intends to integrate with international carbon markets by 2030 and commit the resources from carbon trade to financing locally led adaptation and loss and damage activities (Bangladesh, 2021).

Many developing countries have experience with the Clean Development Mechanism under the Kyoto Protocol (chapter III), the predecessor to the Article 6.4 mechanism. However, developing countries were under no obligation to reduce emissions under the Protocol. Under the Paris Agreement, all Parties have committed to pursuing domestic mitigation measures (Article 4, paragraph 2), including through the use of market mechanisms (Article 6.4). To increase domestic policy control over emissions, countries need to elaborate institutions, policies and regulations that fit their national circumstances. The examples from other developing economies in table 4.I show that institutional quality and flexible and adaptative policy frameworks, as well as skills and capacity, are key to effective emission mitigation.

(a) What does it take to establish a compliance carbon market?

(i) Policies and regulatory frameworks

For carbon markets to be adaptable to national contexts, policymakers need to have control over carbon policies, including carbon pricing and mechanisms for carbon trading. There are multiple approaches to reducing emissions, including command and control mechanisms, as well as market-based instruments that offer more flexibility and efficiency (Krupnick and Parry, 2012). An emission trading system is developed primarily for compliance with domestic environmental laws that require particular entities to meet GHG emission targets. Most of the revenue from carbon trading is generated through emission trading systems (ETS), but there are only 36 such systems operational, and these are in upper middle- and high-income countries (World Bank, 2024).

Environmental laws are central to the institutional set-up of compliance carbon markets. Typically, the regulations specify materials, emissions and types of waste, the sectors or sources that will be regulated, and the administrative arrangements (Narassimhan et al., 2018). The regulations also assign roles to specific

State authorities for the smooth operation of the market and application of the law. The Government's responsibilities include legislating and enforcing the law, developing relevant policies, technical standards and mandates under the law and establishing procedures for allocating quotas for emissions and the transfer of carbon credits, among others. The choice of an allocation mechanism and complementary carbon policies is not simple; it entails trade-offs and extra costs for governments, as baseline data on emissions need to be established, as well as the means for the monitoring and verification of emissions.

Table IV.1 presents examples of compliance carbon markets from selected developing countries. The performance of an emission trading system against the attributes associated with their designs, including environmental and wider economic impacts is not assessed. The examples are chosen for illustrative purposes only, and include emission trading systems of advanced developing jurisdictions that have placed large volumes of emissions under regulatory control, resulting in significant revenues (e.g. Kazakhstan and Shanghai), and others that have introduced carbon taxes in compliance settings (e.g. Mexico, South Africa and Uruguay). These jurisdictions cannot be compared with LDCs in terms of emission intensities, although their total emissions from fossil fuels and the manufacture of cement are somewhat closer to the combined totals for LDCs. For example, two countries each emitted about 18 per cent more than all LDCs combined and one country emitted about 40 per cent less than all the LDCs combined in 2018–2020.[2]

Since 2000, Kazakhstan, an upper middle-income developing country has used abundant mineral resources, consisting mainly of oil and gas, to support market-oriented domestic reforms. The efficacy of domestic policies is boosted by government expenditure on building regulatory and institutional capacity, as well as the technical capacity of the civil service. For example, Article 94-7 of the Environmental Code of Kazakhstan No. 212 of 2007 established a market mechanism for reducing emissions and the absorption of GHGs. In addition, chapter 9 of the law specified the allocation of quotas for emissions to operators of fixed installations and identified the regulated sectors. The law also set the parameters for carbon emissions trading and the procedures for monitoring emissions (Kazakhstan, 2007).[3] The legislation required fixed installations where emissions exceeded the equivalent of 20,000 tons of carbon dioxide (CO_2) per year in the oil and gas sectors, electricity, mining, metallurgical and chemicals sectors and in the production of construction materials such as cement, lime, gypsum and bricks. In the new environmental code issued in 2021, the threshold of emissions for which a mandatory permit was required was reduced to 1,000 tons for entities that must also meet technological standards, implement measures to improve energy efficiency and provide data to the Government for monitoring emissions (Kazakhstan, 2021).

Kazakhstan launched the pilot phase of its emission trading system in 2013 and the second phase was in 2014–2015. These phases were critical to revealing complex technical and operational challenges. The system was temporarily suspended in 2016–2017 to address the challenges, including domestic reporting requirements, benchmarks for allocating quotas and other issues that delayed its full implementation. The initial impact of the Kazakhstan emission trading system was to increase emissions from economic activities placed under regulatory control and the mandating of technological standards for some sectors.

[2] This comparison is based on national-level data from the World Bank World Development Indicators database and does not include Shanghai, which is a subnational ETS.

[3] The legislation defines an installation as a stationary source of GHG emissions or a group of stationary sources linked together by a single technological process and located on the same industrial site (Kazakhstan, 2007).

Table IV.1
Examples of compliance carbon markets in selected developing countries

Institution/ market name	Type	Year implemented	Jurisdiction covered	Country	Jurisdiction emissions covered	Price per ton of CO_2-equivalent as on 1 April 2024	Government revenue*
Kazakhstan ETS	National ETS	2013	Kazakhstan	Kazakhstan	46 (or 0.27 per cent of global emissions)	KZT 504 ($1.12)	KZT 0 ($0) (2021)
Mexico carbon tax	National tax	2014	Mexico	Mexico	44 (or 0.61 per cent of global emissions)	MXN 68.37 ($3.79)	MXN 4 306 million ($217 million)
South Africa carbon tax	National tax	2019	South Africa	South Africa	80 (or 0.84 per cent of global emissions)	ZAR 159 ($8.93)	ZAR 1 689 million ($115 million)
Shanghai pilot ETS	Subnational - City ETS	2013	Shanghai	China	36 (or 0.21 per cent of global emissions)	CNY 59.90 ($8.72)	CNY 141 million ($22 million)
Uruguay carbon tax	National tax	2022	Uruguay	Uruguay	11.2 (or 0.01per cent of global emissions)	YUY 6 024 ($155.87)	YUY 10 482 million ($255 million)

Source: World Bank, State and Trends of Carbon Pricing Dashboard, available at https://carbonpricingdashboard.worldbank.org/ (accessed May 2024).

Note: Latest available year or the reference year in parentheses. CNY – Chinese renminbi, KZT – Kazakhstani tenge, MXN – Mexican peso, ZAR – South African rand, UYU – Uruguayan peso. ETS, emissions trading scheme/system.

The promulgation of the new environmental code of 2021 sought to address many of the challenges, including the removal of distortions caused by subsidies to fossil fuels and a greater focus on the energy sector (power plants, oil and gas operators). Altering the structure of the primary energy supply by increasing investments in renewables could lower the cost of the transition to a low-carbon economy (Zhakiyev et al., 2023). Complementary policies may also be required to reduce the socioeconomic impacts of the withdrawal of subsidies and the introduction of stringent environmental performance and efficiency standards in the power sector.

(ii) Allocating emission allowances and cascaded limits on emissions

A system for allocating allowances is an important policy choice in implementing an emission trading system. The choice has implications for the cap and the effectiveness of an environmental policy.[4] Covered entities react to the cap based on the initial allocation and the cost of obtaining additional allowances (ICAP, 2023). The cap is a carbon price signal, and, ideally, it should be set based on what is feasible within the environmental performance capacities of the regulated

[4] The cap is the quantitative limit on the total amount of GHGs that regulated entities must not exceed under the scope of the environmental regulation or policy.

entities or the sector. If the initial allocation is set above what the entities require at current production technology and abatement capacity levels, they will have no incentive to reduce emissions. Sectors that fall under the cap could face international competitiveness risks from the carbon price (or tax). Therefore, the design of the policy is critical in countries with emissions mainly from trade-exposed sectors such as metals, cement and other raw materials.

Implementing an emission trading system mostly starts with the free allocation of allowances and a transition period during which existing entities are expected to shift from their use of carbon-intensive technologies and processes. This is the case of the Kazakhstan (box IV.1) and Shanghai emission trading systems. The transition period may be used by the regulator to establish the necessary infrastructure for the emission trading system, including exchange platforms and data collection methods, as well as capacity-building among participants. A transition period may also serve as a cushion to protect pre-existing installations from new entrants that might have better production technologies, or from imports from countries that do not regulate emissions. The success of the policies depends on alternative, low-carbon technologies being accessible and at a low cost. Trade-exposed sectors or industries may require exemptions or support during the transition period to allow them to build their capacity to reduce emissions with existing technologies or shift to more efficient technologies.

Benchmarking and grandparenting are the two main methods for determining the volume of the initial free allocation of emissions. Benchmarks are established for each product or sector, and the benchmark values are multiplied by the current or previous production levels of the eligible entities to determine their quotas for the relevant capped period (ICAP, 2023). Although benchmarking rewards best practices and efficient producers, the system may impose a higher cost on economies that are dominated by unsophisticated technologies. Historical emissions may be indicative of future emissions in the sense that larger emitters may require an allocation of allowances that closely matches the share of their previous emissions. Grandparenting takes this notion into account by setting historical emission baselines against which free allowances may be allocated (Knight, 2013). By allocating a greater share of allowances to larger emitters, grandparenting lowers the marginal cost of abatement for larger emitters, but penalizes efficient producers and those that invested in abatement technologies prior to the introduction of emission policies (ICAP, 2023).

The freely allocated allowances can be transferred between entities through trade. An entity can either sell extra allowances or buy additional allowances from an authorized carbon market operator who ensures that the total allocation of emission allowances for each period is not exceeded.[5] Instead of allocating allowances free of charge, the regulator may opt to directly auction the available allowances to eligible entities. Provided the auction is conducted in an open, transparent and non-discriminatory manner, the process may be a means to efficiently allocate allowances to the entities that need them the most. Auctions may enhance the discovery of the true price of carbon emissions, particularly if there are many participants and trading is conducted in a competitive manner. A regulator may also choose an auction to generate revenue, which could be reinvested through spending on environmental protection, adaptation and mitigation. It may be necessary for emission trading system operators to pilot different designs, to gain experience with

[5] When setting the emission cap, the regulator considers the maximum GHG emissions within its emissions target. An absolute cap ensures that the allocated permits do not exceed the upper limit. The cap may also be set in relation to a baseline of historical emissions or projected future emissions, both of which map the trajectory of emissions according to the regulator's choice.

Box IV.1
The Kazakhstan emissions trading system

The Kazakhstan emission trading system was launched in 2013 in a pilot phase as a cap-and-trade system covering CO_2 emissions of large emitters in oil and gas, electricity, mining and construction materials. Full enforcement of regulations and trading in the Kazakhstan emission trading system started in 2014, but the system was temporarily suspended in 2016–2017 to address operational issues and reform allocation rules. Operations resumed on 1 January 2018, with new regulations governing the emission trading system operations, and the establishment of a system for the monitoring, reporting and verification of emissions. During the period 2018–2020, the entities covered had the option of receiving free allowances based on their historical emissions or benchmarks. The implementing authority, Zhasyl Damu JSC, responsible for the registry and reserve management, set aside 11.5 million allowances in a reserve for new entrants and for capacity changes for installations that chose allocation using benchmarks. Since 2021, product-based benchmarking has been used under the emission trading system, which rewards the most efficient entities by granting them the allowances they need for boosting their production levels.

The short durations of the emission trading system pilot phases might indicate a commitment by the authorities to implement it without further delays, but stronger engagement with the various stakeholders may be necessary for political buy-in. In addition, multiple benchmarking standards for allocating emission permits and the prohibition of cost pass-throughs to consumers undermine the incentives for energy producers to upgrade or replace outdated technologies.

Since the goal of the emission trading system is to reduce emissions, the Government, through the implementing authority, adjusts the cap in each implementation period to enforce emission reductions. During the period 2018–2020, it achieved a cap of 485.9 metric tons of CO_2 ($MtCO_2$) per year, on average. A new national allocation plan for 2022–2025 was approved in July 2022 and set a cap of 163.7 $MtCO_2$ for 2023.

Sources: Howie P and Atakhanova Z (2022). ICAP (2022). Kazakhstan Emissions Trading System. Available at https://icapcarbonaction.com/system/files/ets_pdfs/icap-etsmap-factsheet-46.pdf; World Bank, State and Trends of Carbon Pricing Dashboard, available at https://carbonpricingdashboard.worldbank.org/.

rules, procedures and other administrative elements, including monitoring, reporting and verification systems, which are critical for the enforcement of obligations of covered entities.

It is indispensable to establish rules, infrastructure and policies for conducting auctions for the system to succeed. For example, the initial rules for the European Union emission trading system established guidelines for auctioning emission allowances, which were sold in either a 2-day or 5-day futures electronic sales contract. The rules prescribed the procedures for submitting and withdrawing bids, lots (minimum volume of allowances available for bidding), persons eligible to bid, timing and frequency of auctions and how the clearing price and the tied bids would be determined, along with other administrative directives. Since the European Union emission trading system is a regional (supranational) market set-up, the rules also provide for the appointment of an auction platform for joint implementation among its member countries, but the members are also free to appoint auctioneers of their own choice, provided the auction meets conditions set in the regulations (European Commission, 2010). The rules were amended in 2023 to cover new elements, such as extending the scope of the emission trading system to maritime transport and introducing new and separate emission trading system for buildings, road transport and industrial activities not covered by the existing emission trading system. Other changes also became necessary with the aim of aligning the operations with European Union directives (European Commission, 2023).

A regulator's role extends beyond setting rules, procedures and modalities, to establishing baselines, and monitoring, reporting and verification systems

Instead of issuing allowances and setting a cap on carbon emissions, a regulator may opt to implement a system that directly rewards producers that reduce their emissions beyond their obligations. The baseline and credit system relies on a baseline that can be tailored to reflect historical emission levels or performance standards for a product or sector. Once the baseline is established, future emissions are expected to fall below the baseline if covered entities implement abatement projects or emission reduction strategies. When actual emissions fall below the baseline, producers can earn credits that they can sell to other producers who need them (Australia, 2014). For environmental integrity, producers who exceed their baseline emissions could be made to pay a penalty or acquire credits from within the jurisdiction, subject to the limit set according to the baseline. The emission reduction credits are accepted by the regulator and sold as equivalents to allowances. The environmental safeguard in a "baseline and credit" system works only under limited scenarios. Conditions may include a credit offsetting system that is national or subnational, and the credits are subjected to verification of the carbon emission reduction or removal against a baseline or historical emission level. Verification requires an authorized/accredited entity to objectively assess the emission reduction/removal against the baseline using standard methodologies.

Monitoring, reporting and verification processes require the State to develop a robust data collection method and devise strategies for its improvement on an ongoing basis. Such data are useful for improving emission trading system standards and integrity. Under the Kazakhstan emission trading system, monitoring and verification are State functions conducted through a network of stationary and mobile observation points, laboratories and centres of observation of physical and chemical processes occurring at industrial installations that are considered sources of emissions, pollution and waste (Kazakhstan, 2007). The State also operates a system of registries for carbon emission allowances or carbon credits. The registries are databases for tracking accounts of regulated entities; they collect data on all transactions related to government-issued credits/permits, stockholdings of credits/allowances, transfer of credits/allowances to other parties in carbon trading, acquisition of credits/allowances from emission trading

system, reservation of credits/allowances and cancellation and withdrawal from circulation of either credits or allowances.[6]

(iii) Infrastructure for trading and settlement of claims

The design of the emission trading platform and the market infrastructure for conducting such trading are also critical to the success of compliance systems. Compliance carbon markets are exclusive markets buttressed by environmental policies and regulations and shielded from outside influences by restrictions, such as limiting carbon trade among eligible regulated participants (Ibikunle et al., 2016). The Shanghai emission trading system was the first to pilot the spot trading of allowances in China. It is a subnational compliance market covering industrial and non-industrial sectors such as buildings, aviation and shipping (sectors that account for more than half of the city's emissions). The Shanghai Environment and Energy Exchange oversees transactions under the Shanghai emission trading system. Compliance entities are responsible for reporting their direct and indirect emissions from power and heat consumption at a business entity level. In October and November 2022, the Shanghai Environment and Energy Exchange auctioned 2 668 835 allowances for a total of RMB 191.49 million ($27.03 million) (ICAP, 2022).

Emission allowances can be converted into financial instruments and traded under financial market rules. When exchanges are involved in carbon trading, their arbitrage role involves the transfer of commercial and environmental risks from regulated entities in compliance carbon markets to investors in the financial market on the expectation by environmental policymakers that such transactions could lead to a reduction in carbon emissions (Chen and Wu, 2023). Trading can take the form of spot trading or options and/or futures contracts based on the underlying emission allowances or certified emission reductions. In the European Union, carbon products transacted through exchanges are subject to the regulations of the secondary markets on which they are traded and to European Union regulations, which include emission allowances, or derivatives thereof (European Commission, 2014).

(iv) Complementary policies

Compliance regimes may also apply other market-based instruments, such as carbon taxes, performance standards and other market-based incentives, depending on national policy goals and other considerations. Since carbon taxes are exogenously specified, the price of carbon is relatively stable, and the distribution of costs and benefits can be easily established (Goulder and Schein, 2013). Combined with a cap-and-trade system, a carbon tax may be used as a price adjustment mechanism for entities whose emission performance exceeds certain thresholds, or as a measure to cover activities that are outside the cap-and-trade system.

Under both a carbon tax and cap-and-trade, the covered entities are required to provide data on actual emissions for use in calculating tax obligations or emission allowances. The regulatory burden increases with data requirements, particularly when the number of compliance entities is high, or for complex industrial processes involving multiple fixed installations scattered across a wide geographic area. The regulator has the option to absorb the cost of the monitoring and verification of emissions, or pass it on to producers through a carbon tax or a price-adjustment mechanism. For example, Mexico and South Africa have national carbon taxes covering a significant share of their emissions, which yielded revenues of $217 million and $115 million, respectively, in 2023. Uruguay implemented a carbon tax in 2022, covering 11.2 per

[6] Reserved, cancelled and withdrawn credits/allowances are usually inaccessible by regulated entities, either because the exchange between regulated entities has used up the allowance, or the cap has been used up or as a mechanism for adjusting the carbon price.

cent of the jurisdiction's emissions, yielding a revenue of $255 million (table IV.1).

In South Africa, the carbon tax is inflation-indexed and is set to increase with the consumer price index. The tax is economy-wide and covers all activities, including energy industries, mineral industries, manufacturing and construction, transport and metal industries (South Africa, 2019). In the first implementation phase, many sectors benefited from tax-free allowances ranging from 60 to 95 per cent. These included basic tax-free allowances for fossil fuel combustion emissions and for process emissions, a fugitive emissions allowance, a trade exposure allowance, a performance allowance for companies that reduce emission intensities in their activities, a carbon budget allowance and an offsets allowance. The Minister of Finance sets emission intensity benchmarks for sectoral performance, determines the amount of trade exposure allowances and sets rules governing carbon credits.

Carbon tax revenue is usually not the main motive for environmental policy, as new taxes may negatively interact with existing taxes and cause distortions in the economy. It is good practice to introduce carbon taxes as part of a broader reform to improve the efficiency of the tax system. Since environmental tax revenues are part of the fiscal pool, the regulator can choose between spending the revenue on further efforts to reduce carbon emissions, such as subsidizing renewable energy and strengthening the institutional and regulatory frameworks for implementing the environmental policies; or redirecting the revenue to social services, such as education, health, water and sanitation, to benefit communities that are not responsible for emissions (Carl and Fedor, 2016). Other environmental taxes are increasingly being used as policy measures to address climate change. They include taxes on energy, including fuel for transport, taxes on pollution, taxes on resource extraction and taxes on transportation. For example, in 2020, Senegal earned 1.9 per cent of its gross domestic product (GDP) from taxes on energy, including fuel for transport, followed by Uganda, at 1.6 per cent of GDP (table IV.2).

3. Voluntary carbon markets

Voluntary carbon markets are markets in which buyers of carbon credits generally participate without any obligation to offset or reduce carbon emissions. The key actor in such a market is the crediting standards body, which issues certificates to projects for carbon credits generated. The other actors are project developers, validation and verification bodies, market intermediaries and market participants, who may be end-buyers or intermediaries (Akon, 2023). Project developers initiate and implement carbon removal or carbon avoidance/reduction activities that yield verifiable carbon credits. The developer earns profits from the direct economic benefits of the project and from sales of carbon credits. The standard setters in voluntary carbon markets define the requirements for the certification of carbon projects and the methodologies for carbon crediting. Buyers of carbon credits may transact directly with project developers or through market operators (usually brokers, traders and intermediaries) in organized, over-the-counter markets (spot sales). Intermediaries are also active in secondary markets, where they offer futures and options sales contracts on the underlying carbon credits in their portfolios. In both spot and futures contracts, the market participants can be individual end-buyers, corporates, compliance entities, financial institutions and intermediaries that buy and sell credits.

LDCs have been active participants in voluntary carbon markets since the Kyoto Protocol as suppliers of carbon credits, but their participation is marginal both in terms of projects implemented and the volume of credits sold. The Clean Development Mechanism may, at times, have been used as a way for industrialized

Table IV.2

Revenue from energy taxes (including fuel for transport), as a percentage of gross domestic product, in least developing countries implementing environmental policies, 2016–2020

Country	2016	2017	2018	2019	2020
Senegal	2.3	1.4	1.3	1.3	1.9
Uganda	1.5	1.6	1.7	1.7	1.6
Sierra Leone	0.7	1.5	1.1	1.6	1.3
Burkina Faso	1.0	1.1	1.1	1.1	1.0
Lesotho	0.0	0.2	0.2	0.1	1.0
Togo	1.0	1.0	1.2	0.7	0.8
Rwanda	0.9	0.8	0.8	0.8	0.7
Mauritania	0.7	0.7	0.9	0.8	0.7
Mali	1.2	1.0	0.5	0.4	0.6
Chad	0.0	0.0	0.3	0.3	0.4
Niger	0.2	0.2	0.3	0.2	0.2
Democratic Republic of the Congo	0.4	0.1	0.1	0.1	0.1
Madagascar	1.1	1.1	1.4	1.6	

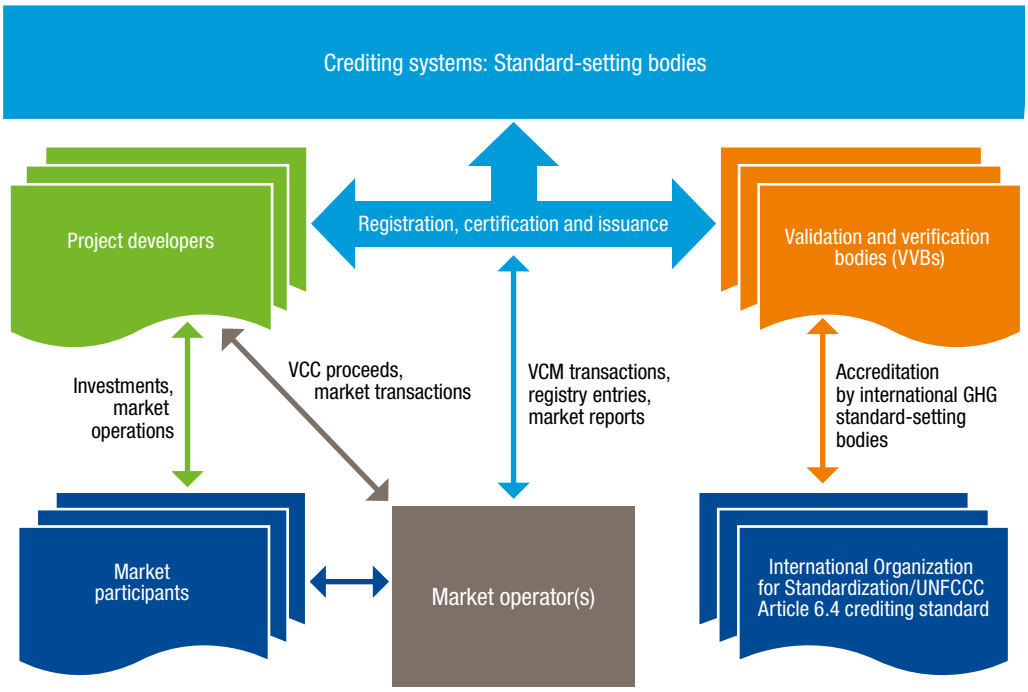
Source: World Bank, State and Trends of Carbon Pricing Dashboard, available at https://carbonpricingdashboard.worldbank.org/ (accessed May 2024).

countries to increase carbon emissions (Richman, 2003). Lessons learned during its implementation could therefore be valuable for LDCs as they transition to the international crediting mechanism under the Paris Agreement (chapters II and III).

The transactions between the major actors in voluntary carbon markets are key to understanding the institutional architecture of such markets. The schematic representation of the key market actors in figure IV.2 broadly illustrates their roles. Of note is the overarching role of independent standard-setting bodies that administer the crediting systems in such markets. The proliferation of such bodies has contributed to the widespread fragmentation of voluntary carbon markets, which, along with the opacity of their transactions and concerns about the lack of additionality[7] and the consequential impact of projects, undermines their reputation (Kreibich and Hermwille, 2021). There is also a perceived lack of accredited validation and verification bodies, particularly in LDCs, which increases concerns about the lack of transparent governance and the credibility of the markets (Howard et al., 2015). Owing to the voluntary nature of transactions conducted in the markets, they are of questionable value to compliance regimes and global mitigation efforts. However, with greater transparency in the technical operations of voluntary carbon markets, convergence in standards may be achieved over time, which would enable the markets to play a more dynamic role in accelerating progress towards meeting net-zero targets.

[7] A project is additional if it would have taken place even in the absence of the expected revenue from carbon credits. In this context, environmental integrity is achieved based on genuine emission reductions or removals above and beyond the baseline scenario.

Figure IV.2
The voluntary carbon market system



Source: UNCTAD.

Note: GHG, greenhouse gas; VCC, voluntary carbon credit; VCM, voluntary carbon market.

(a) Institutional frameworks of voluntary carbon markets

The non-mandatory nature of voluntary carbon markets means that transactions are independent of legally binding mitigation targets on the demand side of the market (i.e. market participants buy carbon credits on a voluntary basis). When the demand arising from voluntary market participants is greater than the demand from those that face mandatory caps on emissions, there will be no pressure on carbon prices, as it means that the supply of carbon credits is greater than the cap. The non-rivalry situation in voluntary carbon markets is due to the overlapping of mandatory and voluntary markets, allowing for the fungibility of carbon credits across multiple jurisdictions, regardless of the sectors of mitigation activities. A more stringent global mitigation framework, such as the one proposed under Article 6.4, may lessen the non-capped participation and create the conditions for more accurate carbon pricing (Kreibich and Hermwille, 2021). Negotiators were unable to conclude an agreement on Articles 6.2 and 6.4 at CMA 5 due to disagreements relating to the appropriate design of the two mechanisms under the Paris Agreement. Further guidance and rules on Articles 6.2 and 6.4 will have long-term implications for the transparency and alignment of carbon markets, with potential knock-on effects on the ambition of countries' nationally determined contributions (NDCs) and on equity-related initiatives (e.g. common but differentiated responsibilities, carbon credits replacing climate finance), as well as other issues under UNFCCC negotiations. Many Parties, including some LDCs, may opt for the acceleration of Article 6 implementation, yet the outcomes of these negotiations will have far-reaching impacts that need to be carefully considered in preparations for COP 29 in 2024 and beyond.

Normally, standard setters operate registries that track the registration, issuance, sales and cancellation of carbon credits. For efficiency, intermediaries may manage registries on behalf of the standards bodies, thereby smoothing transactions between buyers and sellers through their brokerage role. For example, Rabobank is an issuer of certificates that also operates a registry for project developers, as well as acting as an intermediary or broker (Akon, 2023).[8] The operator has registered several projects that have sold credits internationally from Uganda and the United Republic of Tanzania (table IV.3).

The standards body specifies the certification process that it recognizes, including the methodology for the crediting and the accreditation of entities in charge of monitoring, as well as verification of the quality and validity of credits. Transparency in reporting and third-party verification are crucial for maintaining trust and ensuring that each credit is used only once and then retired. The concern with multiple standards is that methodologies are not harmonized across voluntary carbon markets, which raises questions about the credibility and quality of credits (Kreibich and Hermwille, 2021). On the demand side, the non-compliance element induces price volatility, as most participants face non-binding net-zero targets. In contrast, the binding carbon budgets in compliance schemes usually lead to a higher price of carbon ex ante (if the regulator sets the price) or ex post (if the regulator sets a cap on emissions). Some compliance jurisdictions allow regulated entities to obtain credits from voluntary markets, subject to conditions such as quantitative limits, domiciles of projects and eligible sectors.

The certification of carbon projects is conducted by validation and verification bodies, which are accredited entities that audit carbon projects to determine their eligibility to earn carbon credits based on the methodologies of the standard under which a project is registered. Although the validation and verification bodies may be independent from the standard setter, it is important to note that accreditation or approval by a third-party auditor is the standard setter's prerogative. Private certification trends were originally associated with the aim of filling gaps in environmental governance or weaknesses in environmental policies (Andonova and Sun, 2019). In contrast, the Paris Agreement has made the certification of designated operational entities an important step in operationalizing the Article 6.4 mechanism. This process clearly distinguishes State-led and non-State mitigation mechanisms, and in effect, voluntary carbon markets need to align their business models with the provisions of the Paris Agreement in order to participate in the Article 6.4 mechanism.

The governance features of crediting standards are central to ensuring environmental integrity and the accountability of major actors in carbon trade. However, the multiplicity of underlying methodologies and crediting approaches of different standard-setting bodies raises issues regarding environmental integrity. This, in turn, makes it difficult to achieve alignment between bottom-up and top-down carbon market governance mechanisms (Allen and Overy, 2024; Kreibich and Hermwille, 2021). The Paris Agreement represents a paradigm shift in that the rules for implementing Article 6 mechanisms have driven public governance into private-led domains, for the increased oversight of international carbon transactions. This could have the effect of reducing the global supply of credits from uncapped jurisdictions and creating overlaps between voluntary and compliance regimes, leading to greater alignment to achieve net-zero targets sooner under the Paris Agreement. In this regard, the procedural requirement for a host country to issue an authorization

[8] Rabobank and the certifier, Plan Vivo, have co-developed their protocols and methodologies to streamline the certification process under their Acorn framework, which is targeted at small-scale agroforestry projects (see https://acorn.rabobank.com/en/registry/.

Table IV.3
Rabobank carbon credits retired from selected projects in the United Republic of Tanzania and Uganda

Issuance date	Country	Project	Certifier	Number of credits	Buyer
20 December 2023	United Republic of Tanzania	Kaderes Peasants Development Plc	Plan Vivo	1 161	Nationale Postcode Loterij
04 December 2023	United Republic of Tanzania	Kaderes Peasants Development Plc	Plan Vivo	17 484	Microsoft Corporation
19 September 2023	United Republic of Tanzania	Kaderes Peasants Development Plc	Plan Vivo	1 500	Bobo's Oat Bars
24 April 2023	United Republic of Tanzania	Kaderes Peasants Development Plc	Plan Vivo	20 895	Microsoft Corporation
18 April 2023	United Republic of Tanzania	Kaderes Peasants Development Plc	Plan Vivo	500	Luigi Lavazza S.p.A.
09 November 2022	United Republic of Tanzania	Kaderes Peasants Development Plc	Plan Vivo	5 000	Bain & Company
13 December 2022	United Republic of Tanzania	Kaderes Peasants Development Plc	Plan Vivo	6 000	Standard Chartered
02 December 2021	United Republic of Tanzania	Kaderes Peasants Development Plc	Plan Vivo	5 877	Standard Chartered
20 December 2023	Uganda	Solidaridad ECA Uganda	Plan Vivo	7 086	Nationale Postcode Loterij
04 December 2023	Uganda	Solidaridad ECA Uganda	Plan Vivo	4 407	Microsoft Corporation
29 September 2023	Uganda	Solidaridad ECA Uganda	Plan Vivo	117	Stichting Solidaridad Nederland
24 April 2023	Uganda	Solidaridad ECA Uganda	Plan Vivo	7 337	Microsoft Corporation
02 December 2021	Uganda	Solidaridad ECA Uganda	Plan Vivo	1 771	Standard Chartered

Source: Rabobank Carbon Registry, available at https://acorn.rabobank.com/en/registry/ (accessed May 2024).

for Article 6.4 projects is critical to enable Governments to apply domestic policies and regulations, as well as relevant international provisions (rules, procedures and modalities of Article 6) (Ahonen et al., 2022).

Strict adherence to approved accounting methods is necessary to avoid double counting, particularly when the possibility of multiple claims to mitigation outcomes arise. Such situations are common in voluntary carbon markets, because investors and individuals from abroad may participate in the carbon market value chain as project developers, brokers or other roles. Although standard setters have adopted approaches to reduce or eliminate the risk of double counting, there may be a need for government oversight of these approaches to ensure that environmental integrity is maintained. This might involve steps to achieve data consistency across multiple registries, adjustment to national registries for international transactions and reporting to the Article 6 Supervisory Body, as envisaged under the Article 6.4 mechanism. The independent standards distinguish between four areas that are at different levels of alignment with the Article 6.4 mechanism, namely NDC use of credits generated outside the scope of a host country's NDC;

NDC use of credits generated within a host country, with adjustments to the accounts; emission reduction units counted towards NDC but not used for offsetting; and non-compliance credits used for offsetting within a host country but not counted towards NDC (Kreibich and Hermwille, 2021).

Normally, voluntary carbon market actors would not voluntarily divulge full information as part of government oversight processes. There are suggestions that government interference in carbon markets may hinder growth in voluntary markets by burdening private actors with reporting requirements on discretionary activities (Lane and Newell, 2016; Battocletti et al., 2024). On the other hand, some business entities and individuals buy carbon credits from voluntary carbon markets to improve their environmental performance and boost their corporate social responsibility. The private sector's motives for engaging in voluntary carbon markets may be driven by factors other than offsetting carbon emissions and/or achieving net-zero targets. Considerations of cost effectiveness may drive companies to treat carbon credits as a way to meet carbon mitigation commitments at lower cost, rather than investing in projects that embody their corporate values in environmental sustainability and promote well-being through tangible positive sustainable development impacts (Lou et al., 2023).

There are also concerns about benefit-sharing arrangements between project developers and other stakeholders (usually, Indigenous people or local communities involved in nature-based projects) participating in the project directly or affected by its implementation. Most projects do not have arrangements for benefit-sharing over and above payments for results or work carried out during the implementation of projects (Dufrasne, 2023). An absence of benefit-sharing arrangements could lead to project developers or their intermediaries claiming unfair shares of carbon credit sales revenues that should normally be allocated to local communities, workers and other stakeholders in host countries. These situations could give rise to unfavourable perceptions towards carbon markets and, in some cases, to reversals, with communities withdrawing their support for projects (Dufrasne, 2023; Healy et al., 2023).

Some voluntary carbon markets incorporate good practices, such as the Plan Vivo requirement to direct at least 60 per cent of project benefits to local communities.[9] The Integrity Council for the Voluntary Carbon Market lists the disclosure of benefit-sharing arrangements as part of its core carbon principles.[10] Emphasizing benefit-sharing and protecting human rights may initially slow down the development of carbon markets because of the need for additional safeguards and stakeholder engagement. However, these factors are critical to assuring the long-term legitimacy and sustainability of those markets. Ensuring fair benefits and protecting rights can build trust and support from local communities, leading to more successful and sustainable projects (Healy et al., 2023). From a financial perspective, markets that prioritize human rights and benefit-sharing can attract more investors who are increasingly focusing on environmental, social and governance-related (ESG) criteria. Projects that fail to address these issues may damage reputations and create potential conflicts, which can discourage future investment and participation (Martiny et al., 2024; Healy et al., 2023).

Most stakeholder grievances are addressed internally within the markets' institutional arrangements, although there are shortcomings even under standards that have in-built grievance resolution mechanisms. Grievances relate to accessibility, transparency, predictability, independence, adequacy and safeguards. The implications of the shortcomings under some standards are manifold. Primarily,

[9] See https://www.planvivo.org/pvcs.

[10] See https://icvcm.org/core-carbon-principles/.

they make it difficult for people impacted by carbon-credit–generating activities to access remedies and for such remedies to be sufficient to address the harm. This in turn can influence the position of the local communities that are affected by carbon market activities vis-à-vis the project itself and the project proponents, as well as carbon markets more generally. There is a need for contingency plans and safeguards to ensure that communities are not left feeling disadvantaged by the negative impacts of carbon market projects. In LDCs, access to official legal recourse may be more limited than in other countries due to low levels of institutional capacity at the national level for implementing redress processes, or aggrieved person(s) may lack the financial means to access such processes. In order to promote a positive attitude towards carbon market projects among local communities, it is therefore essential that instruments are available to limit the damage that can be caused by carbon market activities, and that a grievance resolution mechanism is in place. Government oversight of projects could ensure that approved projects have a built-in benefit-sharing arrangement and grievance resolution mechanism. In addition, project proponents need to be more transparent and accountable when certified credits are exchanged in carbon trading.

Alignment of voluntary carbon market standards with the Article 6 international carbon crediting mechanisms could strengthen environmental integrity, and improve accountability in carbon trade

The new international crediting mechanism (Article 6.4) largely replicates the Clean Development Mechanism, but with better State-led oversight. The transfer of carbon credits, whether for domestic use or for international mitigation purposes, should trigger reporting requirements in the carbon registries of the Parties or countries involved. For this to happen, the national authority needs to to play a more visible role in project approval processes.

Article 6 rules for the authorization and registration of carbon projects could apply to voluntary carbon market transactions that are exposed to double counting risks (Kreibich and Hermwille, 2021). Recognizing the need for an increased State role presents an opportunity for developing countries to build capacity in regulating, monitoring, certifying and registering climate projects, and for policymaking in an area of significant international interest. The host countries need to determine the institutional arrangements applicable to carbon projects, and how they treat the projects under the Article 6 mechanisms. Without domestic policy and State control, corporate actors and private certification schemes will continue to exert control over project development and determine how benefits are allocated to stakeholders.

Voluntary carbon markets are criticized for the lack of transparency in their financial transactions involving carbon credits (Carbon Market Watch, 2023). The opacity in voluntary carbon markets might also be indicative of asymmetries in information, capacity, technical skills and the use of carbon credits. Governments could adopt measures to ensure that projects are genuinely additional, and that they are in line with national priorities and at appropriate scales of investment (Mendelsohn et al., 2021). LDCs intending to participate in Article 6 mechanisms may have to commit significant resources, both at the beginning of the process for developing the necessary institutions and capabilities and during the process, to further refine policy and institutional frameworks. The choice between compliance and non-compliance mechanisms may also require an in-depth assessment of the respective costs and benefits, including the sociopolitical and environmental implications.

C. International governance of greenhouse gas emissions

In amplifying the international community's role in addressing the challenges associated with climate change, the Paris Agreement has expanded the scope for Governments to exercise more control over carbon trading (Kuyper et al., 2018; Knoll, 2015). As noted in section B, the new international mechanism for international cooperation on mitigation (Articles 6.2 and 6.4) assumes that Parties are actively involved in providing oversight of the implementation of projects, and that they have the capacity to vet, approve and monitor projects that contribute to mitigation and have other positive impacts on sustainable development. Similarly, by entering into bilateral cooperation agreements, countries exercise discretion to meet international obligations under Article 6.2. However, the effectiveness of voluntary cooperation arrangements depends on the balance of influence between the cooperating partners, as well as their common but differentiated responsibilities. The latter accords due consideration to the historical nature of the accumulation of anthropogenic emissions, the progression towards global mitigation targets and the differentiated costs of abatement between developed and developing countries.

CMA establishes the rules, procedures and modalities for implementing the Paris Agreement. The rules place strict conditions on Parties registering carbon crediting projects. This section focuses on how countries are coordinating and cooperating to implement the Article 6 mechanisms. Since the mechanisms are geared towards assisting countries in meeting their mitigation targets, as expressed in NDCs, subsection 1 examines how LDCs intend to use the mechanisms to achieve NDCs. Subsection 2 reviews the institutional requirements for countries to implement Article 6.2 and highlights areas that are still under discussion in the CMA. Finally, subsection 3 focuses on the broader application of the Paris Agreement in voluntary carbon markets and discusses the implications of the rules, modalities and procedures that have emerged.

1. Nationally determined contributions

NDCs are an international mechanism under the Paris Agreement (Article 4, paragraph 2) for communicating national mitigation measures that contribute to achieving the global target of reducing anthropogenic emissions. Parties to the Paris Agreement are required to submit NDCs every five years, regardless of implementation time frames (Doukas et al., 2018). New and updated NDCs are expected to be submitted in 2025, 2030 and beyond. Article 4, paragraph 2 calls on Parties to submit progressively ambitious mitigation targets in each round compared with previous NDCs. Steps have been taken in improving international cooperation on reducing emissions, yet it remains unclear how the periodic pledging of mitigation targets will translate into real-time mitigation at the global level. For instance, updated NDCs, for the five-year period beginning in 2025, are assumed to have taken into account the first global stocktake and new mechanisms in their mitigation targets.

NDCs indicate the domestic mitigation measures that each reporting party intends to implement to achieve the objectives of the communicated contributions. This is unlike the Kyoto Protocol, which placed binding commitments only on annex I countries (industrialized countries), with non-annex I countries (developing countries) obliged to develop and periodically update national inventories of GHGs by sources and sinks (Larson et al., 2008). The flexibility offered

by the NDC process allows countries the discretion to fashion their mitigation options in line with national priorities, although the communicated ambitions may not reflect the actual capacity of the countries to implement their national targets and the repercussions from missing those targets (Röser et al., 2020; Kuyper et al., 2018). A review of the updated mitigation targets in NDCs shows that for the implementation period 2025–2030, countries increased mitigation efforts, but the collective mitigations may not reflect the highest possible national/regional/global mitigations, even when common but differentiated responsibilities and respective capacities are taken into consideration.[11] However, all Parties are expected to promote integrity, transparency, accuracy, completeness, comparability and consistency in NDCs (Article 4, paragraph 13; and Articles 13 and 15).

It is assumed that the process of preparing NDCs contributes positively to climate change policymaking, and that the mitigation targets indicated in NDCs reflect national circumstances, as well gaps in resources and capacity to achieve the targets (Röser et al., 2020). National climate change policies differ in design, technical detail and policy instruments that reflect their political, social and economic contexts. Thus, any two groups of countries could be following different development pathways. The risk for developing countries is that their present level of development may dictate the future orientation of their policies, institutions and structures. This path dependency in policymaking is conditioned by many factors, including the availability of resources, the quality of existing policies, past government decisions in the thematic area, the state of available technology and the capacity to implement incremental changes (Hanger-Kopp et al., 2022). The future development pathways for developing countries should be strongly linked to structural changes, with a renewed focus on green growth policies, investment, productive technologies and trade.

The process of preparing NDCs typically involves setting mitigation targets and reorienting climate policies towards achieving those targets. Developing countries that have less experience with setting a climate change mitigation agenda faced challenges in the initial rounds of preparing NDCs. It is suggested that the voluntary reporting obligations during the Kyoto Protocol era may have contributed to the weak state of national inventories of GHG emissions and to challenges in preparing long-term climate strategies, including low emission development strategies (Röser et al., 2020).

An analysis of NDCs submitted by LDCs shows that 32 of the 45 LDCs intend to use carbon markets; of these, 27 are exploring opportunities for cooperation under the Article 6.4 mechanism[12] and 39 explicitly state that NDCs are conditional on receiving international support in the form of financial assistance, technology transfer and capacity-building, among others. The financial requirements for LDCs to implement NDCs up to 2030 are estimated to amount to $1.48 trillion. More than half of the financial requirements are among countries that have expressed interest in using carbon markets (table IV.4). Twenty-seven LDCs intend to use cooperative approaches (Article 6.4), but many may not have the enabling institutional framework to effectively participate in them.

[11] Most LDCs indicated 2025 and 2030 targets in updated NDCs for 2020. It is critical, for LDCs and other countries, to harmonize implementation periods and align their mitigation contributions to meeting the target of restricting global warming to 1.5 degrees Celsius above pre-industrial levels.

[12] All 45 LDCs have submitted at least one NDC since 2015. Since most LDCs submitted them for the second round in 2020, new and updated NDCs are expected in 2025.

Table IV.4

Least developed countries' financial requirements to implement the nationally determined contributions up to 2030 (billions of dollars)

	Does the country intend to use carbon markets?	
Country	**No**	**Yes**
Central African Republic	445.2	0.0
Ethiopia	0.0	316.0
South Sudan	0.0	100.0
Democratic Republic of the Congo	0.0	71.8
Bangladesh	0.0	57.4
Somalia	0.0	48.5
Mauritania	0.0	46.6
Malawi	0.0	46.3
Angola	0.0	44.1
Uganda	0.0	28.1
Nepal	0.0	25.0
Madagascar	0.0	24.4
Haiti	0.0	22.0
Chad	0.0	21.2
United Republic of Tanzania	0.0	19.2
Afghanistan	17.4	0.0
Guinea	0.0	16.8
Zambia	0.0	15.0
Senegal	0.0	13.1
Mali	11.0	0.0
Benin	10.5	0.0
Niger	9.9	0.0
Eritrea	8.9	0.0
Sudan	0.0	8.2
Cambodia	0.0	7.8
Mozambique	0.0	7.6
Rwanda	0.0	5.7
Djibouti	5.5	0.0
Togo	0.0	5.5
Lao People's Democratic Republic	0.0	4.8
Burkina Faso	4.1	0.0
Sierra Leone	0.0	2.8
Burundi	1.5	0.0
Comoros	1.3	0.0
Myanmar	0.0	1.2
Guinea-Bissau	0.0	0.7
Lesotho	0.6	0.0
Liberia	0.0	0.5
Solomon Islands	0.0	0.1
Gambia	0.0	0.1
Tuvalu	0.1	0.0
Total	516.0	960.5

Source: UNCTAD calculations, based on the nationally determined contributions of the respective countries.

2. Voluntary cooperation under Article 6, paragraph 2

Article 6, paragraphs 1, 2 and 3 of the Paris Agreement sets the conditions under which Parties can engage in voluntary cooperative approaches that involve internationally transferred mitigation outcomes, which, as of 2021, can count towards NDCs. These are measured using robust accounting rules and tracked in the international registry, while also reflected in the registries of the Parties, to ensure environmental integrity.

International cooperation is promoted to achieve higher levels of global mitigation. In this context, Article 6.2 applies to Parties that have submitted NDCs and have put in place institutional arrangements for authorizing and tracking the use of internationally transferred mitigation outcomes towards achieving NDCs. Although Parties have discretion regarding their emission reduction activities and the arrangements for their cooperation, the accounting approaches chosen by the Parties and the outcomes must be reported in line with the enhanced transparency framework under Article 13 and the rules and principles for NDC accounting under Article 4. Implementation of the voluntary mechanism under Article 6.2 requires a lead ministry or a national agency or institution to be designated as the national authority responsible for policy development and coordination on the environment and climate change (figure IV.3). The State's roles and functions assigned to the agency, as stipulated in Article 6, involve the authorization of projects for mitigation outcomes and communicating to relevant stakeholders on the adjustment of registries upon the transfer of internationally transferred mitigation outcomes.

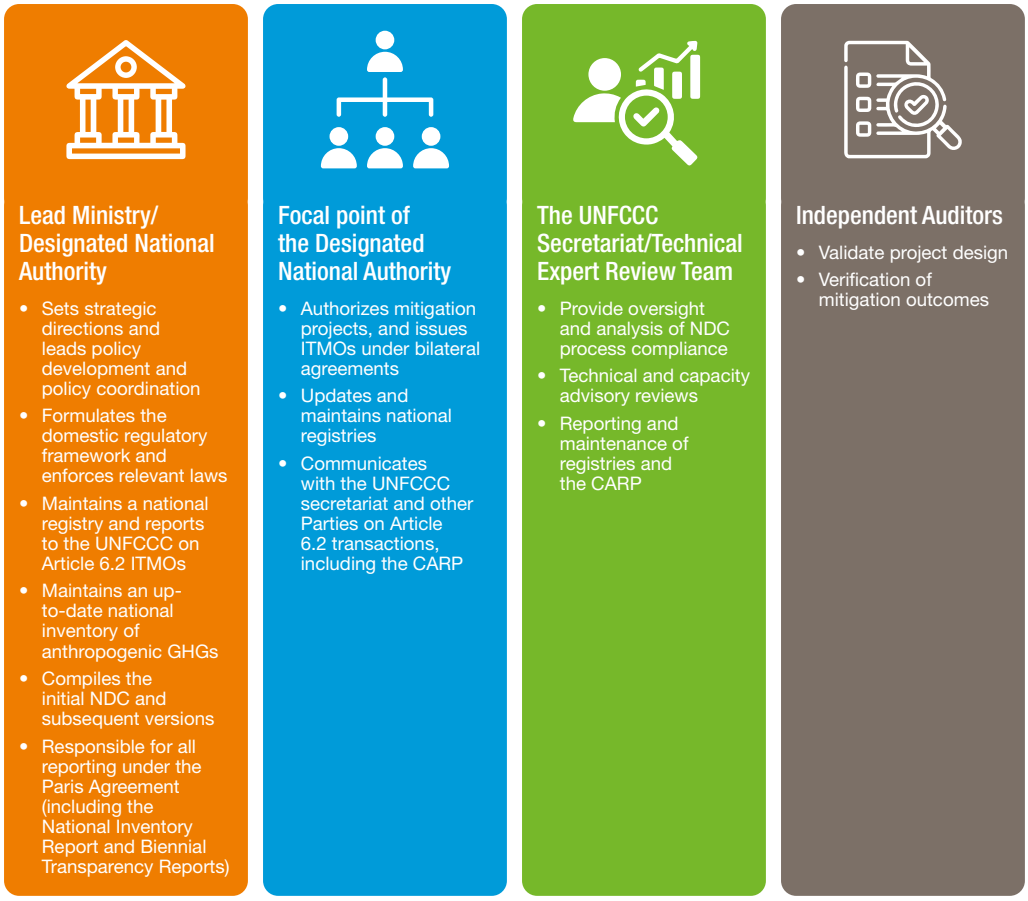
(a) Designating national authorities

All Parties, including developing countries, are responsible for designating an institution, agency or official that can authorize the use and transfer of internationally transferred mitigation outcomes. Multiple institutional arrangements for bilateral and multilateral cooperation may pose a challenge to developing countries if they need to operate highly decentralized structures to meet the requirements of developed-country partners. LDCs need robust, adequately resourced and efficient institutional arrangements to oversee international transactions in carbon markets. It might be a good practice to use the same designated national authority for the Article 6.4 mechanism for all transactions under Article 6 in order to allow for greater oversight and consistent application of the relevant national policies and domestic regulations. The designated national authority may combine the role of policymaking and policy coordination with the formulation of rules, modalities and procedures for the authorization of projects for both Articles 6.2 and 6.4 mechanisms. Such arrangements can help countries build experience and capacity, and map out support requirements for implementing the Paris Agreement.

(b) Registries and reporting arrangements

The overarching rules under Article 6.2 were set at COP 26 (UNFCCC, 2021b) and COP 27 (UNFCCC, 2022b). However, numerous outstanding issues have yet to be negotiated, notably concerning arrangements to authorize internationally transferred mitigation outcomes, reporting and review, and the overall transparency of the system. Decision 2/CMA.3, annex paragraphs 18–24, details accounting, reporting and review arrangements, including the requirements for participating Parties to submit an initial report (table IV.5), as well as annual information and periodic reports. They also include metrics and methods for applying corresponding adjustments and quantifying mitigation information and the sectors, sources and GHGs covered by NDCs, as well as the time periods covered. The information submitted to the UNFCCC secretariat is reviewed by the Article 6 technical expert

Figure IV.3
Institutional arrangements for Article 6 participation



Source: UNCTAD.

Note: CARP, Centralized Accounting and Reporting Platform; GHGs, greenhouse gases; ITMOs, internationally transferred mitigation outcomes; NDC, nationally determined contribution.

review team as part of the enhanced transparency framework process.

Parties intending to cooperate under Article 6.2 are required to submit their most recent national inventory report as part of their biennial transparency report, the first of which is due by 31 December 2024. LDCs have the discretion to not submit a biennial transparency report according to Article 13 (paragraph 2 and 12); however, such reports are important in tracking the following information: inventories; progress towards NDCs; policies and measures; climate change impacts and adaptation; levels of financial support; technology development and transfer; capacity-building support and capacity-building needs; and areas of improvement (Article 13, paragraph 6, 10 and 14). According to decision 2/CMA.3, paragraphs 9 and 29, each party in a cooperative arrangement must maintain a registry involving internationally transferred mitigation outcomes (Article 6.2). The record must include information and data on authorization, first transfer, subsequent transfer(s), acquisition and use towards NDCs, authorization for use towards other international mitigation purposes and voluntary cancellation (including for the overall mitigation of global emissions, if applicable). Access to these accounts is open to all Parties for the purpose of tracking and to cooperative Parties for

Table IV.5
Parties that have submitted initial reports to the Centralized Accounting and Reporting Platform

Party	NDC date/period	Submission date
Suriname	2020-2030	29-May-2024
Guyana	20-May-2016	22-February-2024
Thailand	2021-2030	07-December-2023
Vanuatu	09-August-2022	06-October-2023
Ghana	04-November-2021	14-September-2023
Switzerland	17-December-2021	17-May-2023

Source: UNFCCC, Centralized Accounting and Reporting Platform, available at https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement/cooperative-implementation/carp-submission-portal/submitted-reports#Initial-and-updated-reports (accessed May 2024).

transparency. Interoperability of registries is a requirement in order to achieve data integrity.

National and international registries are critical tools with which to record corresponding adjustments to emission levels that reflect the transfer (export) or receipt (import) of mitigation outcomes. The Centralized Accounting and Reporting Platform maintained by the UNFCCC secretariat is the international registry for all national reports and regular updates to the national registries affecting global-level emissions. This reduces the risk of double counting that may have the effect of raising overall global emissions if mitigation outcomes are claimed multiple times or by more than one party.

The registries for recording national and international transfers of emission reductions and removals are data intensive and require specialized knowledge and technical capabilities. The Article 6.2 reference manual for the accounting, reporting and review of cooperative approaches provides detailed guidelines that include information to be submitted, the timing and sequencing and the procedures. Developing-country Parties participating in cooperative approaches may receive capacity-building support that an Article 6 technical expert review team may identify in consultation with the participating Party. In this context, the national capabilities and circumstances of participating developing-country Parties and the special circumstances of LDCs and small island developing States are recognized.

The data need to be consistent with national inventories that Parties are required communicate to the UNFCCC secretariat in line with the modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement. The national entity or authority preparing the GHG inventories and reports is required to use the 2006 Guidelines of the Intergovernmental Panel on Climate Change (IPCC) or the subsequent version if so decided by CMA. Registries are also required for emission reduction transactions (Article 6.4ERs) (see section C.3).

(c) Outstanding issues

The CMA and COP decisions provide an insight into the direction that Parties may take with respect to outstanding issues on Article 6 and the Paris Agreement in general. Developments on the Article 6 rules, modalities and procedures are informed by recommendations from the Subsidiary Body for Scientific and Technological Advice and draft decisions that are submitted for consideration and adoption by CMA and COP. At COP 28 in 2023, a major issue of concern was whether the scope of cooperative approaches needed to be more clearly delineated. Some Parties stated that Article 6.2 could be implemented

based on decision 2/CMA.3 and decision 6/CMA.4 and other Parties stated that the scope of cooperative approaches needed further clarification, to allow for a degree of uniformity and to help Parties (particularly host Parties) in determining the conditions under which they might engage with Article 6.2. Articles 6.1 and 6.2 of the Paris Agreement, as well as decisions 2/CMA.3 and 6/CMA.4, provide a general understanding that a cooperative approach is undertaken "on a voluntary basis", that it involves the "use of internationally transferred mitigation outcomes" and that certain principles should be upheld with regard to environmental integrity, transparency and robust accounting. However, details regarding the parameters for cooperative approaches may be subject to different interpretations.

This was evident from Parties' different perspectives on the topic in negotiation texts, where at times cooperative approaches were defined as either a framework or an agreement, or a set of mutually agreed standards and procedures, with certain suboptions stating that, among others, cooperative approaches should be categorized as project-based cooperation, sectoral cooperation, subnational/national cooperation or linked emission trading systems (UNFCCC, 2023c). Agreeing on terminology is a challenge in multilateral negotiations, particularly as the choice of language may influence Parties' domestic regulations and have other legal consequences. However, beyond this typical reason, Parties also fundamentally seek more streamlined and harmonized Article 6.2 implementation and clarity on the rules.

Parties also discussed the procedure to be followed when formally authorizing cooperative approaches and underlying internationally transferred mitigation outcomes. Authorization is an essential part of Article 6.2, since it represents formal governmental approval of the transfer or use of internationally transferred mitigation outcomes for a particular purpose (NDC attainment, use in compliance systems or voluntary use by corporations or the private sector; triggers a range of reporting requirements (the initial report describing the cooperative approach follows the authorization); and has implications for when and how corresponding adjustments will be applied to ensure that double counting of internationally transferred mitigation outcomes does not occur. Whether or not a Party is able to revoke its authorization of a cooperative approach or internationally transferred mitigation outcomes is also being negotiated. Therefore, the decision to provide authorization is significant for any Party, as it can have long-term, and potentially irreversible, consequences. In this context, a clearer procedure for providing authorization and the steps that follow needs to be elaborated. At COP 28, Parties also discussed whether there should be a minimum amount of information to disclose in an authorization statement, and whether using a standardized authorization form should be mandatory. Some Parties stated that having a mandatory standardized form would be too prescriptive and others stated that it would ensure greater coherence, since there may be a wide array of cooperative approaches in the future. Clarity on these issues is important for LDC Parties that intend to participate, as they have implications for technical, financial and operational capacity-building (chapter V).

Related to authorization, at COP 28, Parties also considered whether there should be a mandatory sequence of steps after the authorization of a cooperative approach is provided through to the issuance and use of internationally transferred mitigation outcomes. Sequencing may be needed because of ambiguities with regard to what is feasible under Article 6.2 rules. Currently, the UNFCCC secretariat and an Article 6.2 technical expert review team review various reports from Parties on cooperative approaches and internationally transferred mitigation outcomes, to ensure there are no inconsistencies in reporting and that Parties are complying with Article 6.2 requirements. However, at present, it is not evident whether Parties can already

transfer or use internationally transferred mitigation outcomes from a cooperative approach before the approach has been reviewed by the UNFCCC secretariat and the Article 6.2 technical expert review team.

Allowing for the transfer and use of internationally transferred mitigation outcomes prior to a completed review can be problematic. For example, if the determines that a cooperative approach is not compliant with Article 6.2 rules but the underlying internationally transferred mitigation outcomes have already been used by another Party towards its NDC or by a company to fulfil a compliance obligation, it may be challenging, if not impossible, to correct this situation, from both an environmental perspective (e.g. low-quality internationally transferred mitigation outcomes used to offset fossil fuel emissions) and a practical perspective (e.g. to remediate, rescind or impose other corrective measures for an internationally transferred mitigation outcome used for compliance purposes in another jurisdiction that has a particular legal framework). For this reason, it is important for a clear mandatory sequence to be established, such that cooperative approaches are fully reviewed, and any potential inconsistencies addressed, prior to any underlying internationally transferred mitigation outcomes being permitted for transfer or use (UNFCCC, 2023c, paragraph 60).

3. International crediting of emissions and voluntary carbon markets

CMA 3 adopted rules, modalities and procedures for the international carbon crediting mechanism established by Article 6.4 of the Paris Agreement (UNFCCC, 2021a). The Parties designated a Supervisory Body and its membership and rules of procedure for operationalizing the article. The body is responsible for developing methodologies for carbon crediting, registering and managing the registry of activities, accrediting third-party verification bodies and making recommendations to CMA on matters of relevance for the implementation of the Paris Agreement.

The designated national authority for the Article 6.4 mechanism informs the UNFCCC secretariat and the Supervisory Body of carbon credits issued under the mechanism towards the achievement of NDC or for other mitigation purposes (as defined in the annex to decision 3/CMA.3, paragraph 42) (UNFCC, 2021a). To operationalize the Article 6.4 mechanism, the Supervisory Body reviewed the accreditation standards and procedures of the Clean Development Mechanism in 2023 and adapted them to the new mechanism.[13] As such, the role of designated operational entities under Article 6.4 of the Paris Agreement is expected to be similar to that under the Clean Development Mechanism, subject to CMA decisions and established rules, modalities and procedures (UNFCCC, 2023a). The designated operational entities must be accredited by the Supervisory Body as independent auditors that validate projects or verify whether implemented projects have achieved planned GHG emission reductions. The main actors in the Article 6.4 mechanism are project participants that own projects, host-country designated national authorities that oversee national implementation, designated operational entities that provide audit services, the Supervisory Body and the UNFCCC secretariat (figure IV.3).

A validated project is registered by the secretariat (Supervisory Body), while

[13] The Kyoto Protocol had the following three market-based mechanism: Clean Development Mechanism, which operated as a baseline and credit system to finance emission reduction projects in developing countries (non-annex I countries), whereby certified emission reductions generated by these projects could be sold to countries with emission reduction targets (annex B countries); joint implementation, which was also a baseline and credit system but operated in annex B countries, to trade emission reduction units under international oversight (track 2) or not (track 1); and international emission trading, which allowed annex B countries to trade unused assigned amount units that allowed a country to emit 1 ton of CO_2-equivalent.

monitoring and verification are done by the project participants and the designated operational entities, respectively. The scientific aspects of the carbon verification process are critical for ensuring the reliability and quality of carbon credits. Monitoring, reporting and verification need to strictly adhere to the approaches that the designated operational entities apply, based on the rules, modalities and procedures that have been established.

Parties must notify the Supervisory Body of the Paris Agreement Crediting Mechanism (Article 6, paragraph 4(b)) about authorization of any public and private entities as project developers under the mechanism prior to any first transfer of Article 6.4 emission reductions to the mechanism registry. The mechanism's registry, maintained by the Supervisory Body, records all related transactions (issuances and transfers) and distinguishes between those authorized for use towards the achievement of NDCs and those for other international mitigation purposes or authorized uses (decision 3/CMA.3, annex paragraph 55) (UNFCCC, 2021a). The mechanism registry also tracks "Article 6.4 emission reductions "not specified as authorized for use towards achievement of NDCs and/or for other international mitigation purposes (mitigation contribution Article 6.4 emission reductions) that may be used for results-based climate finance, domestic mitigation pricing schemes or domestic price-based measures, for the purpose of contributing to the reduction of emission levels in the host Party" (annex IV, paragraph 29 (b) of the draft decision -/CMA.4) (UNFCCC, 2022a).

The international crediting mechanism raises funds for the Adaptation Fund established by the Paris Agreement. At issuance, 5 per cent of Article 6.4 emission reductions are transferred to the Adaptation Fund held by the mechanism registry to assist developing-country Parties, particularly those vulnerable to the adverse effects of climate change. Another 2 per cent are transferred to the cancellation account for implementing overall mitigation in global emissions in accordance with the CMA decision. Activity participants may also request voluntary cancellation of Article 6.4 emission reductions to contribute to achieving global mitigation targets.

The role of national authorities is not only to approve projects, but also to assess their relevance for national priorities and national policy frameworks. In this regard, the national authority or the designated national authority is required to indicate publicly to the Supervisory Body the type of Article 6.4 activities and sectors that it would consider approving, ensuring that only projects that meet the development priorities of the country are approved. This can be accomplished by setting strategic priorities, policies and regulations before any project is approved for Article 6 mechanisms.

Some countries, including some LDCs, have already taken action to review policies and regulatory frameworks in readiness for Article 6 implementation. Zambia, for example, has issued "Guidelines for the submission and evaluation of mitigation activities under Article 6 of the Paris Agreement: Part I of the carbon market framework for Zambia" (box IV.2). Although the measures are preliminary, and subject to revision, they set out the evaluation criteria and indicators for assessing projects, their mitigation activities and processes and the initial registry structure based on the monitoring, reporting and verification system. The second part, which is under development, will set out the rules for transitioning from the Clean Development Mechanism and for voluntary carbon market projects, the infrastructure for the registry and its procedures, and the fee structure and sharing of proceeds (Zambia, 2023).

The criteria for authorizing projects may be guided by national priorities, and transaction costs of monitoring, verification and reporting to international bodies

Box IV.2
Zambia: Institutional arrangements for Article 6

In Zambia, the Ministry of Green Economy and Environment is the designated national authority for the implementation of Article 6.4. The Ministry will also oversee bilateral engagements under Article 6.2. The Permanent Secretary in the Ministry is the authority for the approval and authorization of proposed mitigation activities, based on recommendations issued by the Technical Climate Change Subcommittee for Mitigation.

This subcommittee is a technical working group responsible for assessing activity proposals against the criteria specified in the Carbon Market Framework for Zambia. The body is not new, as it was previously responsible for reviewing and evaluating Clean Development Mechanism projects. All secretariat matters for Article 6 fall under the Ministry as the designated national authority, and the latter will be responsible for all reporting and related workstreams, including updating NDCs and performing registry operations.

The Zambia Environmental Management Agency is mandated by the Ministry to oversee accounting and monitoring of GHG emissions. However, it requires capacity-building, particularly in forest-related emissions accounting.

Source: Zambia (2023).

D. Leveraging international support for LDCs

The particular circumstances, vulnerabilities and capacity constraints among LDCs are explicitly recognized by the Paris Agreement. The Agreement has several references to "the specific needs and special situations of the least developed countries with regard to funding and transfer of technology" (preamble), "the priorities and needs of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change and have significant capacity constraints, such as the least developed countries" (Article 9) and to the need for capacity-building, particularly for "countries with the least capacity, such as the least developed countries" (Article 13).

This section examines the challenges and the opportunities for LDCs in implementing Article 6 of the Paris Agreement. Subsection 1 discusses the challenges that may arise in the implementation of Article 6 in LDCs. It proceeds by reviewing the approaches that countries are adopting, the nature of their agreements and the implications for national legislation and institutional arrangements, as well as State capacities for verification, monitoring and reporting. It also highlights the implications of various options for carbon crediting, including the attribution of carbon rights and the sharing of benefits from carbon projects. Most LDCs are low-level emitters of GHGs, and have substantial natural resources, mainly forests and other terrestrial and marine ecosystems that act as GHG sinks and reservoirs. These natural resources can potentially increase these countries' carbon credits, on the condition that they retain substantial economic benefits from them and that the buying parties raise mitigation ambitions. In this regard, subsection 2 focuses on the potential benefits that LDCs could leverage from non-market cooperation approaches to unlock further international support for capacity-building, mainly in areas that are critical to their participation in carbon trading. For environmental integrity, equity and the global good, the Parties to the Agreement need to commit to bringing net-zero targets forward while implementing Article 6.

1. Challenges posed by the Article 6 mechanisms

(a) Policies, institutions and regulatory frameworks

The transition to a low-carbon development trajectory may not be easy among most developing countries. LDCs need to pursue industrial and structural transformation agendas to achieve sustainable development. However, policy trade-offs are significant for low-income countries due to their particular circumstances, which, among others, restrict their feasible options. NDCs of LDCs, for example, indicate that their contributions to global mitigation efforts are largely conditional on international support, which ranges from 10.0 to 68.8 per cent of the cost of implementing NDCs. This implies that the NDCs that have been submitted by these countries reflect ambitions that may be politically achievable within their budgets and national priorities, but not to their full potential (UNDP, 2023). In addition, they also reflect broader awareness of the national stakeholders, and how decisions associated with their implementation affect various groups in the economy (Röser et al., 2020).

Apart from the financing gap, the major challenge for many LDCs in effectively implementing the Paris Agreement is that domestic policies, institutions and regulatory frameworks are generally at an early stage of development. Although many LDCs signalled in NDCs the intention to use carbon

markets in the future (table IV.4), the clearest indication of their contribution to global mitigation efforts is through environmental policies. To date, LDCs have not yet implemented mandatory carbon policies to reduce emissions from industrial processes, but a few have developed guidelines, or are formulating policies, for voluntary cooperation and transactions involving international carbon credits (chapter II).

Carbon markets are complex, and the international architecture implied by the Paris Agreement is a challenge for countries that have not yet developed the appropriate domestic policies for their implementation. Carbon markets have some potential to contribute to global mitigation efforts for countries that have prepared for them, as shown in chapter II, but countries need to be realistic about the role those markets can play in mobilizing fiscal resources and capital for projects that are necessary for structural transformation in LDCs.

Government policies on benefit-sharing and their environmental regulations might have a positive or negative impact on the markets, depending on how investors perceive those policies (Streck, 2020). However, situational factors in LDCs may prevent the implementation of compliance market policies because of national circumstances such as low industrial emissions and the lack of policies on carbon trading. It might be necessary for carbon market policies to be introduced incrementally, in a phased manner in order to allow for the assessment and testing of various policy instruments.

(b) Scale of national carbon markets

Most LDCs are structurally small open economies with limited financial market depth. Therefore, it may be prudent to jointly implement carbon policies at the regional level, including setting up market structures to attract investments in carbon projects and scale up the volumes of carbon credits. For example, the Africa Carbon Markets Initiative was created with such objectives in mind, namely to enhance climate action and potentially generate demand for carbon credits in the region.[14] A regional approach allows countries to pool resources for institutional functions, such as harmonizing and strengthening their regulatory frameworks, maintaining a regional registry of carbon credits and reporting to the international supervisory body. It also requires countries to harmonize their environmental policies and cooperate in projects that have regional benefits. The cost savings from a regional approach may be particularly significant for smaller economies, particularly if the net benefits of the regional approach are to increase demand, raise the quality of the carbon credits generated and increase the net price for carbon credits from the cooperating countries.

(c) Access to international support

Article 6 details infrastructure requirements for participating members. It also requires the rigorous reporting and tracking of mitigation outcomes. These activities necessitate the creation of a dedicated government institution to operationalize national registries for Article 6.2 and Article 6.4 mechanisms and take charge of reporting requirements under the mechanism. Governments also need to put in place relevant policies, institutional and regulatory frameworks and domestic arrangements for activities and transactions involving both mechanisms.

The African group of negotiators expressed the need for effective means of implementation, including in the areas of research and technology development, an additional thematic focus on economic and fiscal instruments, regional and international cooperation on adaptation and renewable energies and just transition practices,

[14] The Africa Carbon Markets Initiative is a project developed by the Global Energy Alliance for People and Planet, the Rockefeller Foundation, Sustainable Energy for All, the United Nations Economic Commission for Africa, and the United Nations Climate Change High-Level Champions.

among others (Mantlana and Nondlazi, 2024). There are also concerns about the dilution of climate-related and sustainable development finance, highlighting the need for criteria, principles and guidelines with regard to the implementation of Article 6.8 and carbon markets in general (UNCTAD, 2023). Most LDCs depend on external financing for development and the debt vulnerabilities of these countries have increased since the COVID-19 pandemic (UNCTAD, 2023, 2020). Debt relief and external debt cancellation could free up resources for mitigation and adaptation in climate-vulnerable countries. Effective climate action could be achieved with more financial and technology support to LDCs, to implement programmes that could assist in accelerating low-carbon development and structural transformation. This implies, for example, support for sustainable production and consumption, developing green export strategies, greening supply chains and enhancing transparency and stakeholder participation in market and non-market actions (Greenpeace and CLARA, 2023).

UNCTAD, in *The Least Developed Countries Report 2023*, emphasized the gravity of the debt crisis, compounded by the impacts of climate change and the polycrisis, on LDCs. It also highlighted the proliferation of debt-creating official development assistance (ODA) and shrinking fiscal spaces in these economies. UNCTAD stressed that climate finance needed to be distinct, transparent and additional to development finance.

Carbon markets have the potential to mobilize large-scale investments and finance (chapter II), but for LDCs, the markets need to be reformed and more vibrant, to expand liquidity. In some cases, it might be necessary to increase the proportion of emissions placed under a compliance regime to boost carbon prices and increase mitigation ambitions. The latter could be introduced through cascading emission caps in sectors targeted for mitigation in conformity with NDC submissions. In addition, LDCs could use their long-term low-emission strategies to align climate policies with their development priorities. Most importantly for LDCs, the development and transfer of technologies, investments and private financial flows could be key in achieving a low-carbon economy. Financing instruments for the low-carbon transition need to be adapted to the particular needs of LDCs to enable appropriate and flexible access to climate finance. Non-market approaches under the Article 6.8 mechanism being proposed by developed-country partners should be additional and complementary to ODA and to private-sector investments in climate projects. Joint programmes under non-market approaches could also unlock opportunities for countries to cooperate on adaptation and mitigation, and boost trade and investment (Keohane et al., 2017; UNCTAD, 2023).

There are many areas in the rules on Article 6 that remain under negotiation, such as rules, modalities and procedures on particular issues, including removal activities. Agreement has not yet been reached on the Article 6.4 Supervisory Body's draft recommendations on removal activities presented to CMA 5 (UNFCCC, 2023b).This is partly because Parties have different priorities and domestic circumstances, which means that certain activities that fall under the category of removals may be preferred. Parties have concerns ranging from the quality of certain types of activity and the competitiveness of domestic projects if the market is oversupplied to broader fundamental questions on who bears liability for the long-term monitoring of removals and for the remediation of reversals, for example. In addition, the recommendations on removal activities need to address the permanence and remediation of reversals. Therefore, clarity is needed with respect to the rules on the treatment of emission reduction activities that risk reversal.

For LDCs, forest and land-based mitigation projects offer the greatest potential for participation in voluntary carbon markets (chapter II), but these areas remain under negotiation. Given the lack of outcomes

on removal activities at CMA 5, the Article 6.4 Supervisory Body has been tasked with revising its draft recommendations with a view to their consideration at CMA in 2024. Ahead of COP 29, there are several pertinent issues for LDCs, particularly regarding who is liable for conducting monitoring, reporting and verification after the end of a project's last crediting period and for how long, as well as how reversals will be addressed. Several Parties at CMA 5 considered the draft recommendations to be indefinite in this area. For example, one of the recommendations was that monitoring should be conducted after the end of the last crediting period (UNFCCC, 2023b; paragraph 16 of annex II), but a time frame was not provided for the duration of such monitoring, and a provision was introduced to halt monitoring if a project developer made a request (requiring approval by the Supervisory Body), either by providing evidence that the removals faced a negligible risk of reversal or that potential future reversals had already been remediated based on the project's current reversal risk rating. However, the grounds for what constituted "evidence" were not provided, key terms, such as "negligible", were undefined and reversal risks could either be underestimated or increase in the future for many project types, all of which rendered this provision questionable. Liability for monitoring and for any potential future reversals will ultimately fall to the host Party after the project developer is discharged of responsibility. As NDCs become more ambitious and cover more sectors, and as emissions data become more granular, host Parties will increasingly account for emission sources and sinks at higher levels of detail. For example, several large-scale nature-based projects may appear to face a low risk of reversal while the projects are in operation yet, in future, it may be seen that the risk was underestimated and that significant reversals have taken place. In such an instance, the host Party, which may be an LDC, given that nature-based projects are more common in LDCs, will need to address the reversals at a considerable financial cost, while also making up for the unexpected significant release of GHGs, through additional mitigation efforts in order to ensure that it can satisfy its NDC.

As nationally determined contributions' targets become more ambitious, host Parties should watch the technical details of projects that carry significant risks of reversal

2. Opportunities afforded by the Article 6 mechanisms

The Paris Agreement is a technically demanding international treaty. Successful domestication of the Agreement requires several steps to assess the readiness of countries to fully comply with its articles. The focus of this chapter is on Article 6 mechanisms, yet the discussion serves to show the extent of the policy-related, institutional and technical challenges that LDCs are likely to face. It may be a good practice for LDCs to adopt an incremental approach to institution-building, rather than charting a new pathway with limited experience. NDCs submitted by LDCs indicate that most countries have adopted a cautious approach by electing to build on their experiences by retaining Clean Development Mechanism institutional arrangements. Many countries have also put in place coordination mechanisms to implement major frameworks, such as the 2030 Agenda for Sustainable Development and successive programmes of action for LDCs, including the Doha Programme of Action for the Least Developed Countries for the Decade 2022–2031 (UNDP and UNRISD, 2017; UNCTAD, 2021).

National development plans and NDCs should guide the conception of projects that can be considered for authorization by developed-country Governments. In this regard, certain criteria may need to be set, such as a minimum threshold for investments or operational capital, positive sustainable development impacts and higher standards for credits. Many developing countries in Africa have taken the first steps in regulating carbon market transactions in their jurisdictions (see annex 4 of this report).

Projects should also reflect the ambition set in NDCs, particularly those consistent with

national long-term development plans. This is particularly important for LDCs that are at a low level of industrial development and have a high proportion of the population that lacks access to basic services, including energy. For example, clean energy has been identified as one of the more important interventions for mitigation and has the potential to yield significant co-benefits (Edenhofer et al., 2012). NDCs of the five countries with the least access coverage show that they have prioritized clean and renewable energies, both as a mitigation strategy and as a sustainable development path out of poverty. For example, the Burundi NDC features energy as a key sector that will benefit from an additional 64.85 megawatts (MWs) of hydroelectricity and 7.5 MWs of solar power. Chad plans to construct a 210-MW gas-powered turbine and large-scale photovoltaic power plants that will add 240 MWs to the grid by 2025 and an additional 400 MWs by 2030, and seven wind power plants of 100 MWs are also planned. South Sudan plans to increase energy from renewable sources from 300 MWs in 2021 to 1,450 MWs by 2030 and, according to its NDC, plans to develop six hydropower plants over a period of 10 years, to 2035.

As countries formulate long-term development plans, including a low-carbon development framework, policy designs need to be rigorously tested against strategic considerations, taking into account political and economic suitability at the domestic level. The following are some other strategic considerations at this stage: assessing regulatory and institutional capacities; strengthening enforcement mechanisms (including monitoring, reporting and verification strategies); defining roles and responsibilities across government institutions and addressing capacity gaps; piloting and streamlining operational procedures and outlining technical details (including guidance, policies and regulations for approving mitigation activities for effective engagement with Articles 6.2 and 6.4 mechanisms, as well as non-market voluntary activities under Article 6.8); and assessing infrastructure requirements, along with the operating procedures and tools needed to meet reporting-related and other commitments under the Paris Agreement.

Most countries that have established compliance markets began with pilot models through which to gain experience before implementing the technical and structural infrastructure needed to operate a fully fledged national carbon market. Some countries, such as South Africa, have a series of policy instruments, including carbon taxes, rebates and other incentive structures, as part of carbon policies. Regulatory, scientific and statistical capacities are major areas that require development and skills development. The voluntary market model also provides countries with many entry points for policy development and the enhancement of regulatory capacities. Ghana, for example, issued a regulatory framework for carbon markets, which establishes the institutional structure as well as eligibility criteria for projects (annex 4).

In the international crediting mechanism under Article 6, Governments need to track activities throughout the process, from project authorization to the issuance of credits. Governments are also responsible for reporting, including internationally transferred mitigation outcomes or certified emission reductions. The cost of establish monitoring, reporting and verification protocols that are robust and less vulnerable to manipulation is not negligible. Governments need to define requirements, including eligible sectors, the regulations for authorizing projects, the applicable fees and taxes and the benefit-sharing arrangements. The designated national authority could map pathways that strategically respond to national development priorities by applying a selection process for the approval of projects and adhering to robust crediting methodologies. A cost recovery mechanism is therefore also needed, as some of the infrastructure and capabilities needed for these technical functions may require upfront investments

and technologies that may not be readily available in some developing countries.

LDCs could benefit from the facilitation offered through various mechanisms of the Paris Agreement to assess their readiness and address gaps in policies, institutions, regulations, finance, technology and infrastructure. As noted in chapters II and III, lessons drawn from Clean Development Mechanism experiences could be useful in addressing identified gaps and in refining project approval processes. Many Clean Development Mechanism projects that were registered in low-income countries did not attract demand for carbon credits, raising concerns that project developers were not aligned with national priorities. For instance, many Clean Development Mechanism projects targeted nature-based solutions, whereas some LDCs prioritized the development of energy, transport, agriculture, forestry, waste management, cement production and technologies.

Article 6, paragraph 8 can unlock international support for LDCs and other countries that are vulnerable to climate change and other shocks. The article defines a framework for non-market approaches aimed at assisting Parties "in the implementation of their nationally determined contributions, in the context of sustainable development and poverty eradication, in a coordinated and effective manner, including through, inter alia, mitigation, adaptation, finance, technology transfer and capacity-building, as appropriate" (United Nations, 2015b). A work programme needs to be developed to implement the framework (decision 4/CMA.3) with the potential to respond to climate actions that the markets cannot address. Providing LDCs with financial, technological and capacity-building support is essential for their effective participation in the mechanism.

The Article 6.8 mechanism may balance the discourse that overemphasizes the role of carbon markets in mobilizing resources for climate actions. Most LDCs have viable land- and forest-based resources they could use for NDCs, which are critical for results-oriented activities aimed at reducing emissions from deforestation and forest degradation, as well as sustainable forest management and conservation (REDD+), in addition to overall nature conservation. Non-market approaches could be important in amplifying the positive sustainable development impacts of projects, in contrast to common practices in voluntary carbon markets whereby actors assume multiple roles as standard setters, project developers and traders, often to the detriment of climate justice, equity and environmental integrity (Blum and Lövbrand, 2019). A major positive contribution of non-market approaches in this regard could include securing land-tenure rights and promoting rights-based approaches in the interests of local communities and Indigenous people who may be involved in nature-based solutions focusing on agriculture, forestry and other land uses. Such approaches could also be key to strengthening policies and capacities for ecosystem protection and for a just transition to a low-carbon economy. In addition, they could help foster support for the technical and financial capabilities needed for adaptation activities, such as land restoration, and for promoting sustainable practices that are key to living within planetary boundaries (Greenpeace and CLARA, 2023).

International cooperation is critical in order to enable LDCs to access the support noted under the Article 6.8 mechanism. The approaches proposed will only succeed if countries can benefit from the initiatives and leverage the kind of support that responds to their particular circumstances. The proposed areas of focus have increased since the initial focus areas were agreed upon. However, resources pledged for the implementation of the initiatives have not matched the needs. Country proposals submitted to UNFCCC in the context of identifying and framing elements of the work programme on non-market approaches as set out in decision 4/CMA.3 highlight areas that are likely to pose challenges in implementing carbon market mechanisms. They point to the need for the joint

implementation of programmes carried forward from the Rio Conventions (i.e. UNFCCC, the Convention on Biological Diversity and the United Nations Convention to Combat Desertification). They also show the need for new, innovative areas of cooperation by the Parties on non-market approaches and collaboration with non-Party stakeholders in activities consistent with the Paris Agreement. For LDCs, further work on capacity-building related to the technical aspects of the Paris Agreement needs to be elaborated by the Parties in implementing Article 6.8.

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Annex 4: Selected examples of domestic policies with regard to voluntary carbon markets

Benefit-sharing is a major issue that Governments are interested in regulating in voluntary carbon market transactions. It is useful for LDCs to draw lessons from the experiences and good practices of some developing countries in this area. For example, the Kenya regulatory framework stipulates how benefit-sharing agreements between communities and project developers should be structured and how the country could benefit from land-based and other projects. This includes environmental protection, adaptation, contribution to the international climate obligations of the country and upholding the rights of local communities and benefit-sharing with them (box 4.1). The process of establishing a benefit-sharing formula is complex, as is the choice of the many types of project benefits that may accrue to local communities and Indigenous people. In the Congo, the plan includes how benefits should be managed for the good of the community (box 4.2). The Ghana regulatory framework establishes, inter alia, fees relating to the management and issuance of credits and benchmarks for mitigation options that will be retained domestically (box 4.3).

Box 4.1
Kenya Climate Change (Amendment) Act 2023 and voluntary carbon markets

Kenya has been one of the leading countries in the voluntary carbon market in terms of the number of projects and credits originating in the country. Kenya has had dedicated legislation on climate change since 2016, in the form of the Climate Change Act. In 2023, this Act was amended to include regulations for carbon markets. The amendment sets out several important provisions for greater transparency and safeguards; for example, it contains a mandate for the development of a publicly accessible national registry of carbon credits and it requires carbon projects authorized under the Act to undergo environmental and social impact assessments.

The Act also makes a clear distinction between land-based projects and other projects. Land-based projects (though not defined) are required to have a community development agreement that outlines the relationships and obligations of the participants in a project under development on public or community land. The community development agreement is to be made public in the registry. The Act also stipulates that a community development agreement must contain information on how the project will share at least 40 per cent of its annual aggregate earnings with the community, for land-based projects, and at least 25 per cent, for non-land-based projects.

Regulations under the Act aim to ensure that carbon market activities not only benefit those involved in a project, but also support positive development in the country more broadly. This includes environmental protection, adaptation, contribution to the international climate obligations of the country and upholding the rights of, and benefit-sharing with, local communities. However, there may be a need to align terminologies used in the national context to those used in the international crediting mechanism under article 6, to avoid ambiguities and misunderstandings by various actors and to ensure correct interpretation of the regulations to safeguard the environment and human rights.

Source: Climate Change (Amendment) Act, 2023. Available at https://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/2023/TheClimateChange_Amendment_Act_No.9of2023.pdf.

Box 4.2
The Congo benefit-sharing plan

The Congo will soon implement its benefit-sharing plan for its emission reduction programme in Sangha and Likouala, the two most forested departments in the country. This is not part of a carbon market mechanism, because no carbon credits will be created; rather, it is part of a jurisdictional REDD+ programme that generates payments for results (payments for emission reductions), which are then distributed to the beneficiaries, including Indigenous people and local communities, by the World Bank Forest Carbon Partnership Facility via its Carbon Fund. Projects that are funded by the Carbon Fund are required to have a benefit-sharing plan in place. Although it is not a credit-generating project, implementation of the benefit-sharing plan serves to provide useful lessons in the regulation of benefit-sharing by host countries, including LDCs.

The benefit-sharing plan of the Congo states that participating Indigenous people and local communities will receive both monetary and non-monetary benefits. The monetary benefits paid are based on their performance and participation in the implementation of emission reduction programme activities. The plan stipulates that the monetary benefits must be reinvested in community projects chosen by the communities, with an NGO service provider appointed to manage the benefits on behalf of the communities.

The benefit-sharing plan distributes different shares of benefits based on various scenarios. For example, if all of the direct beneficiaries – Indigenous people and local communities, the private sector and the Government – fully perform their assigned functions, Indigenous people and local communities will receive 30 per cent of the net revenues from the sale of emission reductions for their contributions to the programme, the private sector will receive 55 per cent and the Government will receive 15 per cent.

If the private sector performs, but Indigenous people and local communities underperform, for example, the latter will receive a percentage of the private sector's share of net revenues. If the opposite occurs, Indigenous people and local communities do not need to give a portion of their share to the private sector. In case of non-performance of the programme (i.e. no net emission reductions are achieved), a "performance buffer reserve" is activated. This is a reserve that automatically sets aside a percentage of gross payments that act as an insurance policy to ensure that beneficiaries are still paid a certain amount. Not all information in the benefit-sharing document, such as on the monitoring and evaluation of performance (e.g. performance thresholds), is addressed in the present discussion.

The following are some key takeaways based on a review of this benefit-sharing plan:

- Requiring the existence and implementation of a benefit-sharing plan is an important element of carbon market participation. This is an aspect which LDCs could work towards when engaging with Article 6 or the voluntary carbon market.
- The concept of a non-performance buffer reserve that ensures that Indigenous people and local communities still receive some benefits in years when a programme does not perform as well as planned is a good system with which to cushion the shock of low or non-existent revenues due to the overall underperformance of the programme.
- The benefit-sharing plan of the Congo appears to be in line with the requirements of the Forest Carbon Partnership Facility, yet parts of it are complex and may be difficult to achieve. Benefit-sharing plans, whether in this context or in the voluntary carbon market context, should be as clear and precise as possible so that all beneficiaries and other stakeholders engaging in the voluntary carbon market can understand their respective roles and responsibilities.
- It would be desirable in some contexts for communities to have direct control over project benefits. It may also benefit the local communities if some proportion of the revenues are paid directly through cash transfers.

Sources: Forest Carbon Partnership Facility Carbon Fund Methodological Framework, Section 5.2 on benefit-sharing (2020). Congo, 2020. Benefit sharing plan for the emission reduction programme for Sangha Likouala Version 5 (Ministry of Forest Economy), available at https://documents1.worldbank.org/curated/en/962821607411556246/pdf/Republic-of-Congo-Benefit-Sharing-Plan-for-the-Emission-Reduction-Program-ERP-for-Sangha-Likouala.pdf.

Box 4.3
Ghana carbon market regulation

Ghana published its framework on carbon market regulation in December 2022. It is among the most comprehensive frameworks formulated by prospective host Parties, and addresses issues related to Article 6 and voluntary carbon markets. These include the legal mandate of the Ghana Article 6 framework, the respective roles and responsibilities of the relevant institutions in Ghana, eligible mitigation activities, authorization requirements, the fee structure for corresponding adjustments and requirements for voluntary carbon market projects and actors among others.

The framework establishes broad parameters concerning potentially eligible mitigation activities the Government may authorize under Article 6. It delineates clear institutional responsibilities between the Ministry of Environment, Science, Technology and Innovation, the Environmental Protection Agency and the Carbon Market Office and its three committees. It also identifies any mitigation outcome already covered by the unconditional part of the Ghana NDC for inclusion in a "red list", rendering it ineligible for authorization under Article 6. This is because mitigation under the unconditional part would not be considered additional. As a result, only mitigation concerning the conditional part, or beyond the NDC scope, can be potentially authorized. Such clarity is positive, since it can diminish the risk of non-additional activities being approved.

The framework has also established a "white list" of mitigation activities or technologies that fall under the conditional part, or beyond the NDC scope, that can be deemed automatically additional (i.e. no requirement to demonstrate technical, regulatory or financial additionality). Automatic additionality is based on five criteria, with three categories included on the white list for the period 2022–2025: waste handling, renewable energy and sustainable cooking, each with their own subcategories. According to the criteria, the activity or technology must: be part of the conditional mitigation programmes of action in sectors/subsectors/categories in the Ghana NDC; align with the Ghana sectoral regulatory or standard requirements; contribute to sustainable development and demonstrate environmental integrity; be consistent with the priority areas established in a bilateral agreement between Ghana and the participating Party in an Article 6.2 cooperative approach; and align with the applicable technologies in the latest version of the Clean Development Mechanism positive list of technologies approved by the Executive Board.

The policy to waive additionality tests for certain activities was likely designed to provide greater certainty to the market. However, project-level additionality tests could strengthen environmental integrity.

The framework also establishes a measure aimed at mitigating the risk of overselling by not fully authorizing all credits (i.e. mitigation-sharing). For every 1,000 mitigation outcomes, Ghana will authorize 990 mitigation outcomes, thereby reserving 1 per cent of all issued credits in a national buffer account "to shore up the risk of overselling against the NDC target or contribute to overall mitigation of global emissions." The framework also specifies that Ghana will issue an annual public notification on the use of such reserve units, which provides for greater transparency. Integrating the principle of partial authorization (or mitigation-sharing) and seeking transparency about how such units will be used is a good practice that could be replicated by other developing countries engaging with Article 6. However, the reserve rate to counter the risk of overcrediting may have to be adjusted on a case-by-case basis, depending on national circumstances. For example, Indonesia has proposed a higher rate of 10–20 per cent for a domestic reserve for activities within its NDC scope and a minimum 20 per cent rate for activities outside its NDC scope.

The Ghana framework has also set seven different types of fees related to the management and issuance of carbon credits and provides authorizations via corresponding adjustments. These include fees to create an account in Ghana's carbon registry, issue units and provide letters of approval and corresponding adjustments. Some fees are set at a flat rate, while others depend on issuance volume and on the type of project (small-scale vs large-scale, forestry vs non-forestry). Overall, such a comprehensive framework, which details the processing and managing of some of the administrative and technical costs of running the Carbon Market Office, its registry and more, is positive for the development of carbon markets.

For example, the fee for applying corresponding adjustments is set at either $3 per internationally transferred mitigation outcome for grant-based small-scale activities or $5 per internationally transferred mitigation outcome

for all other types (small-scale mitigation activity, large-scale non-forestry activity, forestry activity). It is important to apply corresponding adjustment fees that seek to reflect the opportunity cost to NDCs and the marginal cost of processing the authorization. The framework stipulates that 90 per cent of the proceeds from the corresponding adjustment fee will be directed to a mitigation ambition fund to support additional mitigation beyond NDC (and to the conditional part) and that the remaining 10 per cent will cover administrative costs of creating and reporting on internationally transferred mitigation outcomes. This approach is a good way to factor in the cost of authorizing internationally transferred mitigation outcomes that can no longer count towards the Ghana NDC, and to then finance additional mitigation activities from the revenues. The appropriate fee per internationally transferred mitigation outcome may not be known in advance, as markets are still adjusting to the new international crediting mechanism. In future, countries may have to adjust the fees or install automatic adjustment measures in order to recoup appropriate fees that reflect opportunity costs and the international market price of carbon credits. Thus, as implementation of Article 6 in Ghana progresses, it may be worthwhile to consider whether the existing fees are appropriate or need to be revised upwards.

Finally, the Ghana framework grants pre-approval to some voluntary market standards such as the Gold Standard, Verra's Verified Carbon Standards, the REDD+ Environmental Excellence Standard and certain ISO standards. It also states that methodologies will still be assessed by Ghana on a case-by-case basis. Given that methodologies adopted by some standards may lead to inaccurate quantification of mitigation (e.g. overcrediting, non-additional activities and impermanent outcomes), the cautionary approach taken by the Government is another good practice. Importantly, any project on the voluntary carbon market must seek formal recognition from the Ghana Carbon Market Office, regardless of whether the credits will be authorized under Article 6. This is a prudent measure as it allows some oversight of voluntary carbon market activities. In addition, any prospective voluntary carbon market project developer must apply for formal recognition of their project by the Carbon Market Office, which serves as another important way for the Office to review the quality of a prospective project before it can be registered and any carbon credits issued.

In conclusion, the Ghana carbon market framework is comprehensive and provides numerous lessons for other developing countries aiming to establish their own regulations. This example underscores the high level of detail required to design such a complex framework. There are many positive examples of how government intervention can deliver greater oversight and control over domestic carbon market activities, which are unregulated in many countries. The framework's positive provisions include a comprehensive delineation of institutional responsibilities, a clear process for authorizing carbon credits under Article 6 and seeking to capture the opportunity cost of applying corresponding adjustments, a provision for partial authorization (mitigation-sharing) and a requirement for all voluntary carbon market projects to apply for government approval. Evaluation of the regulations may be required in future to ensure that they remain relevant as carbon markets evolve.

Sources: Government of Ghana (2022). Ghana's framework on international carbon markets and non-market approaches, available at https://cmo.epa.gov.gh/wp-content/uploads/2022/12/Ghana-Carbon-Market-Framework-For-Public-Release_15122022.pdf.

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