Germany‘s carbon market coope-ration with Ethiopia: Prospects for engaging with Article 6 of the Paris Agreement

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Content

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Project Background

This case study is part of the third work package of the research project "Analysis of interactions between new market mechanisms and emissions trading systems" tendered by the German Emissions Trading Authority (DEHSt) at the German Environment Agency (UBA) (FKZ 3714 41 506 0). It builds upon two previous outputs produced under the project (see Kachi et al. 2016; Cames et al. 2016).

Study objectives

Germany has been a key-actor in promoting market instruments and in fostering an international carbon market. In the context of the paradigm shift induced by the Paris Agreement Germany's existing cooperation in the field of carbon markets may require some readjustment and further development in line with the rules and regulations to be further developed under Article 6, which outlines market based instruments under the Paris Agreement. The purpose of this research is to gather evidence towards addressing this question.

To achieve this purpose, the work focuses on three exemplary cases from countries that have traditionally collaborated with Germany on carbon markets. The case studies build upon the rationale that different countries find themselves at different stages of carbon market development and that the development stages have specific implications for the potential use of Article 6. The study provides an in-depth assessment of each country's explicit interest in participating in carbon market development in a post-Paris world and its capability to realise this interest. In the absence of concrete rules for Article 6, the assessment provides a first order estimate of the readiness of countries to engage in Article 6, and identifies pathways for Germany to continue supporting its partner countries in developing rule-based and well-functioning market instruments.

Approach

The case studies are the concluding component of the following three-stage framework in the project[1]:

1. **German carbon market cooperation:** As a first step, current German engagement in carbon market cooperation, including in major initiatives and funds, was outlined. This set the stage for the compilation of a comprehensive carbon market cooperation inventory.
2. **Country selection process:** In the second step, the cooperation inventory was taken as the basis for selecting countries for the case study assessment. Three candidates were chosen based on a multi-step selection approach. These represent a spectrum of different levels of carbon market development (from early to advanced). The **selected countries were Ethiopia (early), Vietnam (medium) and Ukraine (advanced).**
3. **Case studies:** An in-depth analysis of the three case countries was undertaken in the third step. The case studies provide a first order estimate of a country's readiness to engage in different market options presented by Article 6 and the pathways for future cooperation with Germany for developing rule-based and well-functioning market instruments.

Methods

The case studies combine thorough desk-based research with expert interviews to arrive at a meaningful analysis and derive concrete recommendations on a country level and beyond. They also benefit from two international workshops carried out in January 2017 and May 2017 that provided additional insights and feedback on the assessment.

1 The first two components were developed as a stand-alone document. These along with the other two case studies can be found at: https://www.dehst.de/DE/Klimaschutzprojekte-durchfuehren/Ausblick/ausblick-node.html.

Acknowledgement

We sincerely thank representatives from Ethiopia's Ministry of Environment, Forests and Climate Change Mr. Binyam Yakob Gebreyes and Mr. Yohannes Ameha Assefa; and Mr. Ambachew Fekadeneh Admassie, from Ethan Bio-Fuels PLC (negotiator, market mechanisms) for their valuable inputs and review. The research also benefits from inputs provided by participants of the two project workshops conducted in January 2017 and May 2017.

Finally, the paper benefits from inputs provided by Dr. Karsten Karschunke from the German Environment Agency at various stages of this research.

Abstract

This paper discusses the current readiness of Ethiopia to engage in carbon market options that may be presented under Article 6 of the Paris Agreement. Engagement readiness is discussed using three indicators: i) enabling conditions present in the country to participate in markets; ii) the feasibility of maintaining robust accounting and MRV standards to ensure both the quality of emission reductions and transparency of transfers; and iii) the compatibility of the country's nationally determined contribution (NDC) to deliver the environmental integrity of Article 6 and strengthen the mitigation ambition of the Paris Agreement. The paper argues that instruments that build on baseline and crediting approaches appear to be the most immediate carbon market entry-point for Ethiopia, considering its experience, capacities and interests. Such instruments may develop under Article 6.4 and/or come under the purview of Article 6.2's cooperative approaches. These assertions are arrived at using empirical evidence from interviews, project workshops and literature review on the three indicators of readiness considered in this assessment. Based on the assessment, recommendations are made for Germany to further support Ethiopia to participate in Article 6. Three support entry-points are recognised: first, furthering in-country MRV capacity for market mechanisms; second, providing focussed technical support on common elements/linkages between Article 6 and NDC implementation; and third, sharing own experiences and lessons learnt for instrument design and implementation. The case study further highlights the need for creating more interlinkages between markets and other relevant agenda items in the ongoing negotiations, especially with Article 13 on transparency issues and Article 9 on climate finance. Addressing these interlinked elements in a collective manner is critical for the effective implementation of the Paris Agreement.

Kurzbeschreibung

Die Fallstudie diskutiert Äthiopiens ‚Readiness' für die Nutzung von Kohlenstoffmarktmechanismen, die möglicherweise im Rahmen des Artikels 6 des Pariser Abkommens umgesetzt werden. Die ‚Readiness' für ein mögliches Engagement Äthiopiens im Kohlenstoffmarkt wird anhand von drei Indikatoren betrachtet: i) Rahmenbedingungen im Land, die eine Teilnahme am Kohlenstoffmarkt erleichtern; ii) die Durchführbarkeit von robusten Emissionsberechnungen und MRV, um die Qualität der generierten Emissionsreduktionen und die Transparenz ihrer Transfers zu gewährleisten; und iii) die Kompatibilität des nationalen Klimaziels (NDC) mit Artikel 6, um die Umweltintegrität zu erhalten und die Minderungsambitionen des Pariser Abkommens zu stärken. In der Studie wird argumentiert, dass für Äthiopien solche Instrumente, die auf ‚baseline-and-crediting' Ansätzen aufbauen, den unmittelbarsten Einstiegspunkt in den globalen Kohlenstoffmarkt bieten – basierend auf den Erfahrungen, Kapazitäten und Interessen des Landes. Solche Instrumente werden möglicherweise unter Artikel 6.4 und/ oder im Rahmen der ‚cooperative approaches' unter Artikel 6.2 Gestalt annehmen. Die in der Studie vorgestellten Ergebnisse basieren auf empirischen Daten aus Interviews, Projektworkshops und Literaturrecherche zu den drei genannten ‚Readiness' Indikatoren. Ausgehend von der Bewertung der Indikatoren werden Empfehlungen ausgesprochen, wie Deutschland Äthiopien hinsichtlich der Teilnahme an den Mechanismen unter Artikel 6 bestmöglich unterstützen kann. Drei mögliche Ansatzpunkte für eine solche Unterstützung werden identifiziert: zunächst steht eine Förderung der MRV Kapazitäten für Marktmechanismen im Vordergrund; an zweiter Stelle steht die zielgerichtete technische Unterstützung von gemeinsamen Elementen und möglichen Verknüpfungen zwischen Artikel 6 und der Implementierung des nationalen Klimabeitrags (NDC); und drittens wird das Teilen eigener Erfahrungen und Erkenntnisse hinsichtlich der Ausgestaltung und Umsetzung von Marktinstrumenten hervorgehoben. Die Fallstudie hebt auch die Notwendigkeit hervor, eine stärkere Verknüpfungen zwischen Marktaspekten und anderen Themen, zum Beispiel Artikel 13 (Tranzparenz) und Artikel 9 (Klimafinanzierung), herzustellen. Die Adressierung dieser miteinander verbundenen Elemente ist essenziell für die effektive Umsetzung des Pariser Abkommens.

List of Abbreviations

AGN	African Group of Negotiators
BAU	Business as usual
CAT	Climate Action Tracker
CDM	Clean Development Mechanism
CER	Certified emission reductions
Ci-Dev	World Bank's Carbon for Development initiative
CORSIA	Carbon Offsetting and Reduction Scheme in International Aviation
CRGE	Climate Resilient Green Economy strategy
ERC	Ethiopian Railway Corporation
GDP	Gross Domestic Product
GTP	Growth and Transformation Plan, Ethiopia
GEF	Global Environmental Facility
ICAO	International Civil Aviation Organisation
IKI	International Climate Initiative
ITMOs	Internationally Transferred Mitigation Outcomes
JCM	Joint Crediting Mechanism
LDC	Least Developed Countries
LRT	Light Rail transport
MAPT	Measurement and Performance Tracking for Mitigation Actions project
MoEFCC	Ministry of Environment, Forests and Climate Change, Ethiopia
MRV	Monitoring, Reporting and Verification
NAMAs	Nationally Appropriate Mitigation Actions
NDC	Nationally Determined Contribution
POA	Programme of Activities
PMR	World Bank's Partnership for Market Readiness initiative
RTK	Revenue tonne kilometres
REDD+	Reducing emissions from deforestation and forest degradation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SRM	Sectoral Reduction Mechanism
UNFCCC	United Nations Framework Convention on Climate Change

1 Introduction

Ethiopia	
Profile:	Least developed country
Income group:	Low-income
Population:	102,403,196[2]
GHG emissions:	146 M t CO_2e, in 2013 including LULUCF (1.58 t CO_2e/capita)[3]
Key growth sectors:	Agriculture, Services, Industry (Construction), Transport

Ethiopia is a federal parliamentary republic with nine states (called 'national regional states'). The current political system is based on the Ethiopian Constitution of 1995. Despite recurring inflationary challenges and environmental extremes, especially droughts, Ethiopia's economy has grown at an average annual rate of 10 % over the past decade, with much of this growth driven by state owned and administered institutions. It now aims to transition its economy to achieve middle-income status by 2025.

Currently, agriculture and services contribute over 80 % to the country's GDP, but industrial activities are increasingly gaining focus in Ethiopia's development planning (Table 1). The first five-year development plan – the Growth and Transformation Plan, GTP I (2010-2015) – placed a strategic focus on creating enabling conditions for priority industrial sectors such as textiles, sugar, leather products and cement while doubling agricultural production by 2015. These goals were achieved as economic value added by industry increased gradually from 10 % to 16 % per year over the course of the GTP I period and agriculture maintained its value (The Ethiopian Herald 2015). The second GTP (GTP II) continues from 2016 to 2020 and aims to further integrate the industrial and services sectors in the Ethiopian economy. It further aims to promote higher value crops and livestock production to shift the economy towards agro-industrialisation.

In 2013, Ethiopia's national emissions stood at 146 M t CO_2e, i.e. 0.4 % of global emissions. This includes emissions from Land, Land-use change and forestry (LULUCF). As Figure 1 illustrates, emission intensive sectors that account for a large share of total emissions in high-emitting countries, such as industry and power, currently make up a much smaller share of Ethiopia's national emissions. Industries contribute approximately 1 % of the national emissions, most of which comes from the construction sub-sector. The power sector also accounts for a small share of energy sector emissions as Ethiopia's grid is largely reliant on hydropower. The energy sector overall emits close to 15 % of the national emissions and a major share of this is from transportation. Close to 80 % of the national emissions originate in the agriculture (i.e. crop production, livestock, manure and agricultural soil management), forestry and land-use sector (Federal Democratic Republic of Ethiopia 2015, p.54).

However, this situation is expected to change as socio-economic development progresses. Similar to the rest of Africa, Ethiopia is experiencing high rates of urban population growth of ~4.4 %/year (Federal Democratic Republic of Ethiopia 2011, p.92). Developmental pressures and the economic vision to achieve middle-income status by 2025 is expected to increase demands for energy intensive infrastructure in the country. As per official estimates, the industrial sector, followed by transport, are expected to register the largest annual growth in emissions (Federal Democratic Republic of Ethiopia 2011, p.15). The sectoral emissions profile may, therefore, become more evenly distributed over the years.

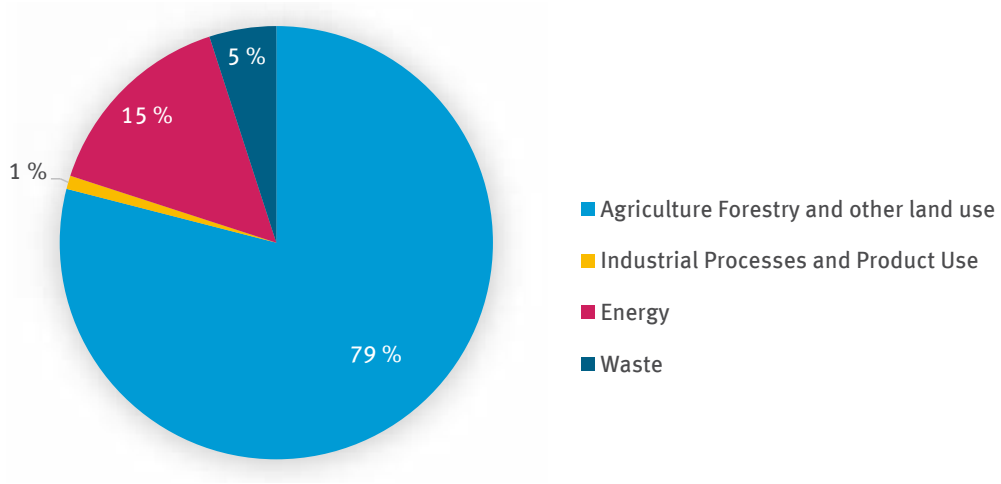
2 (World Bank 2016c)

3 As reported in Ethiopia's latest national communications (Federal Democratic Republic of Ethiopia 2015). These include LULUCF emissions and are based on AR4 IPCC Global Warming Potential (GWP) factors over a 100-year time horizon.

Table 1: Overview of socio-economic indicators for Ethiopia

	1990	2000	2010	2011	2012	2013	2014	2015
Population, total (millions)	48.1	66.4	87.6	89.9	92.2	94.6	96.9	99.4
Population growth (annual %)	3.4	2.9	2.6	2.6	2.6	2.5	2.5	2.5
GDP (current billion USD)	12.2	8.2	29.9	31.9	43.3	47.7	55.6	61.5
GDP growth (annual %)	2.7	6.1	12.6	11.2	8.7	10.6	10.3	9.6
Inflation, consumer prices (annual %)	5.2	0.7	8.1	33.2	22.8	8.1	7.4	10.1
Human Development Index (HDI)	-	0.284	0.412	0.423	0.429	0.436	0.442	-
Agriculture, value added (% of GDP)	52.0	47.8	44.7	44.7	48.0	44.9	41.9	41.0
Industry, value added (% of GDP)	9.8	12.2	10.2	10.5	10.3	11.9	14.7	16.3
Services etc., value added (% of GDP)	38.2	40.0	45.1	44.7	41.8	43.2	43.4	42.8
Exports, goods & services (% of GDP)	-	-	-	16.7	13.8	12.5	11.6	9.8
Imports, goods & services (% of GDP)	-	-	-	31.6	31.6	29.0	29.1	27.4

Source: World Bank 2016b



Source: Federal Democratic Republic of Ethiopia (2015)

Figure 1: Overview of Ethiopia's emissions profile and major contributing sectors

As Ethiopia stands on the cusp of an economic transition, it aims to delink future economic growth from emissions. To this effect, the government developed a Climate Resilient Green Economy (CRGE) strategy in 2011. The plan sets out a blue-print for creating a green economy delivered through zero carbon growth. Agriculture, forestry, power and transport form the four key pillars of the CRGE strategy. The CRGE strategy aims to increase agricultural and land use efficiency; GHG sequestration in the forestry sector; renewable power development; and technology advancement in the industry, transport, and building sectors.

International cooperation is considered critical for achieving Ethiopia's climate action plans. The country's submissions to the United Nations Framework Convention on Climate Change (UNFCCC) recognise this and position carbon markets as a channel for support. Past international cooperation with Ethiopia has focussed on building the fundamental knowhows and capacities on market based instruments. German carbon market cooperation, in particular, has supported research in identifying enabling factors for the uptake of carbon market based approaches in Sub-Saharan Africa, particularly on standardised Clean Development Mechanism (CDM) methods and accounting approaches. German funding has further provided platforms for sharing experiences between countries on developing national processes, capacities and systems for accounting mitigation measures in a measurable, reportable and verifiable manner at multiple levels (i.e. national, intervention and actor level)[4].

4 Author's compilation under work package 2 of the project.

These activities have been carried out in close cooperation with national actors through bilateral or multilateral channels.

This cooperation needs to be continued and realigned considering the changing paradigm of multilateral effort under the Paris Agreement. The expanded international coverage of the Paris Agreement invariably links carbon markets to global mitigation effort, as each country has domestic targets towards the accord and the flexibility to use markets as a seller/buyer to achieve them. Further, and crucially, Article 6 allows for the use of flexibility instruments to encourage countries to strive for 'higher ambition in their mitigation and adaptation actions' (Art 6.1) and 'deliver an overall mitigation in global emissions' (referred to only in Article 6.4). With carbon markets still on the drawing board two years after the Paris Agreement was signed, the continued ambiguity on how markets will develop and interact with national policy frameworks and international commitments creates a need for country-level research. Through this case study, options for addressing these ambiguities are conceptualised in the Ethiopian context and recommendations are made on multilateral and bilateral cooperation pathways for Germany, to improve the readiness of countries to engage with market options under Article 6.

The case study is structured as follows: Section 2 provides the background on carbon market experience of Ethiopia, starting from the years of the CDM to Ethiopia's plans under the nationally determined contribution (NDC). Section 3 elucidates Ethiopia's position on the use of Article 6 of the Paris Agreement and identifies current domestic capabilities for participation. Section 4 introduces a non-exhaustive list of market options that may be developed under the Paris Agreement framework. It further outlines the framework for assessing the readiness to engage with these market options. Keeping these background elements in mind, Section 5 provides an assessment of Ethiopia's readiness for different participation options and respective needs for the implementation of these options. Finally, in Section 6, specific recommendations are provided for Germany's entry points to support Ethiopian participation in mechanisms developed under Article 6. Insights from the Ethiopian case for informing further development of the modalities and procedures for Article 6 are also briefly discussed.

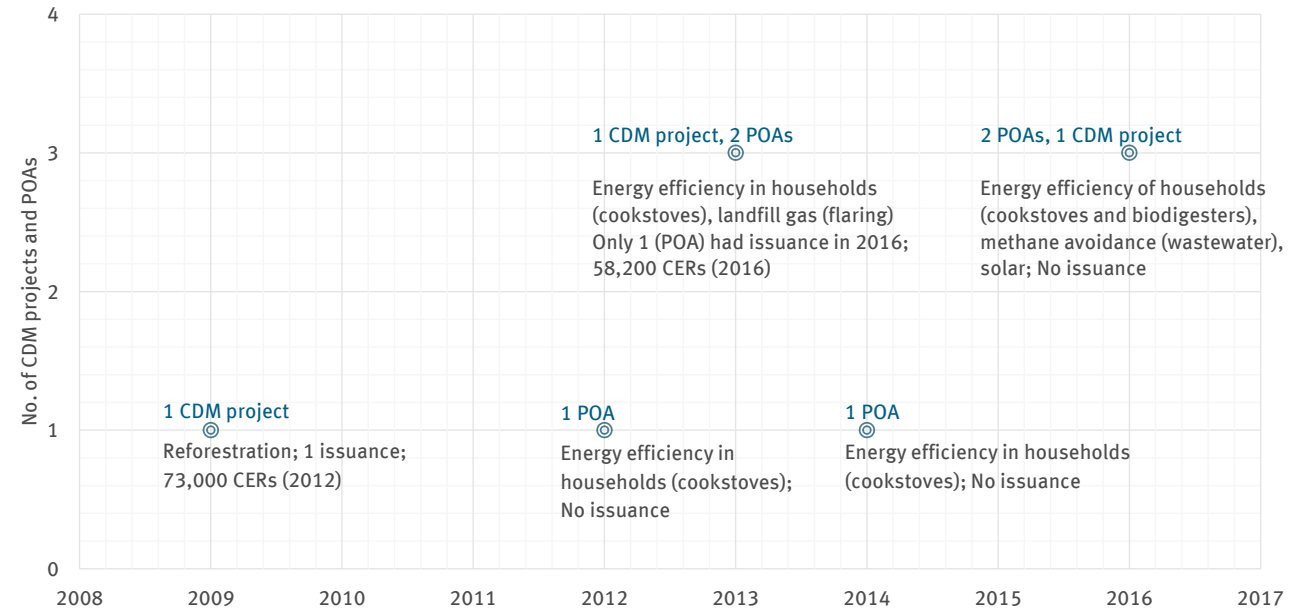
2 Setting the scene: carbon markets in Ethiopia

Ethiopia's current carbon market experience comes largely from its participation in international market based instruments, particularly the CDM. Ethiopia has the highest technical potential among LDCs to develop CDM projects, estimated at 32 million Certified Emission Reductions (CERs) annually (Arens & Burian 2012). This potential lies mostly in mitigation activities addressing agricultural residues; followed by hydropower, energy from forest residues and efficient cook stoves. Yet much of this potential could not be translated into registered projects due to a range of domestic, international and mechanism design related challenges.

2.1 Glance into the past: Carbon market experience, opportunities and challenges

Ethiopia has registered eight projects under the CDM so far. Three of these are single CDM projects and five are Programmes of Activities (POAs). Ethiopia is also part of a registered regional POA. The registration history of CDM projects is illustrated in Figure 2. Of all registered projects, only two have had CER issuances. No successive issuances were requested. This is likely to be due to the decline of global CER prices in compliance carbon markets. One project is currently under validation; a step required prior to applying for registration under CDM.

Ethiopian projects have focussed on reducing emissions from economically and socially relevant sectors. These are: forestry, household energy efficiency, renewables and the solid waste and waste water sectors. The first CDM project was registered in 2009 in the forestry sector the 'Humbo assisted natural regeneration project' – and was also the first registered afforestation/reforestation project from Africa. All registered POAs, except for one solar programme, entail the deployment of energy efficient cook stoves for domestic use. These projects aim to reduce non-renewable biomass consumption in households and deliver socio-environmental co-benefits such as reduced deforestation and improved health. The waste sector projects include one project on landfill gas recovery from open waste sites in Addis Ababa and another one on methane avoidance by construction of a common effluent treatment plant for industrial waste in Modjo city, a tannery hub.



UNEP DTU's CDM and POA pipeline (version: February 2017)

Figure 2: Registration history of Ethiopian CDM projects

Several factors constrained the participation of Ethiopia in CDM. A 2012 report by a high-level panel established by the CDM Executive Board summarises drivers that influenced CDM implementation and constrained CDM investments in some countries and regions. These include limitations in national CDM capacities, CDM system complexity, unfavourable national investment climate, smaller overall mitigation potential (represented by national GHG emission levels) and limited prior CDM experience (Spalding-Fecher et al. 2012, pp.130–132). All these challenges are relevant in the Ethiopian case as indicated by the stakeholders interviewed as part of this study. Capacity challenges linked to limited readiness and knowhow in the country on utilising the CDM; scarcity of CDM consultants and verifiers for project development; and limited availability of domestic and international credit for upfront financing of projects made manoeuvring through the complicated UNFCCC process challenging for Ethiopian stakeholders. Further, CDM Executive Board's decision-making inconsistencies in specific projects and unequal representation in CDM governance structures is quoted as another constraint by one of the interviewees. Additionally, the reduction potential of many individual projects was too small to generate a sufficient quantity of emissions reduction credits to compensate the upfront costs. Further, a large proportion of the mitigation potential lay in physically disaggregated sectors such as household energy efficiency instead of point sources which are comparatively less complicated to account.

Constraints specific to project types further impeded CDM uptake. For instance, having a hydropower reliant grid means that the grid electricity emission factor for Ethiopia is quite small. This meant that Ethiopia was unable to benefit from renewable energy opportunities as per the CDM's assessment framework for power projects. Some other promising sectors, such as forestry, were simply too challenging to set up and implement CDM activities. The 'Humbo assisted natural regeneration project' developed by the non-governmental organisation (NGO) World Vision and supported by World Bank's BioCarbon Fund was developed over a period of six years from pre-project preparation to registration (Brown et al. 2011). The concept of POAs, introduced for tapping micro-scale mitigation potential under CDM, however, was an important launching pad for Ethiopia, with five POAs registered within a span of five years.

UN agencies have been working with the Ethiopian designated national authority (DNA) in building capacity under the Nairobi Framework for CDM capacity building in under-represented regions. Efforts under this framework included supporting the Ethiopian DNA on tasks such as website development (UNDP 2017). International partners have also supported the identification of mitigation opportunities and project development. Four Ethiopian projects have been supported so far by the UNFCCC's CDM Loan Scheme, which covers the CDM project cycle cost[5], reducing the upfront financial burden on project developers.

5 Support includes PDD development and consultant costs, registration fees.

However, support efforts have not resulted in substantial numbers of new projects on the ground, especially when the support has not been extended throughout project development. Ethiopian experience with international support resonates the general experience with donor support, where a lack of domestic capital limits what capacity building could achieve (Okubo & Michaelowa 2010). Further, the demand for CERs diminished just when capacity building efforts started showing results (Kreibich et al. 2017).

The German government's cooperation approach has been to support research activities aimed at developing Ethiopia or region-specific methods, approaches and guidance for carbon markets and monitoring, reporting and verification (MRV). For instance, under its *Umweltforschungsplan* (2012), the German Environment Agency (UBA) sponsored a study to develop a standardised baseline framework for rural electrification projects in East African countries. The intention of the exercise was to develop an advisory tool to assist DNAs and practitioners in developing and implementing standardised CDM approaches for rural electrification in Eastern Africa, with Ethiopia as a case study. Another project funded under the International Climate Initiative (IKI) focussed on sharing experiences on institutional capacity development for national greenhouse gas (GHG) accounting under the Measurement and Performance Tracking for Mitigation Actions project (MAPT).

While on-the-ground results have been limited, the CDM experience increased the familiarity of Ethiopian policy makers with mitigation (Hoch 2012). The Ethiopian DNA has actively involved itself in carbon market activities. By 2010, over 40 project information notes were submitted to the DNA (Hoch 2012, p.13), most from public sector actors as country is dominated mainly by state owned and administered institutions. In recent years, a broad range of local actors have also engaged in CDM project development. Project submissions have come from the Addis Ababa City Administration, the Leather Industry Development Institute, the Development Bank of Ethiopia and some regional and local consultancies have also emerged.

2.2 Current carbon market activity

Ethiopia was quick to adapt mitigation ideas initially conceptualised under the CDM into nationally appropriate mitigation actions (NAMAs) and aims to get international finance, including through markets (e.g. as credited NAMAs). For instance, the NAMA for Ethiopia's Light Rail Development was initially conceptualised under the CDM. Ethiopian NAMAs focus on building the much-needed infrastructure and capacity in three sectors energy, waste, and transport – and are in line with the otherwise strong inclination of the Ethiopian government to develop these sectors.

- **Transport:** The transport sector NAMAs focus on railways and are spearheaded by the Ethiopian Railway Corporation (ERC). The first railway NAMA aims for a transit oriented development strategy for the recently inaugurated Light Rail Transport (LRT) in Addis Ababa; the second seeks support for developing a railway academy for training professionals, and a third on undertaking vulnerability assessment. ERC launched the first leg of their LRT in 2015 and is now adapting the NAMA proposal, which could not receive funding from the NAMA facility, for submission to the Green Climate Fund (GCF) (ERC 2016).
- **Waste:** The waste sector NAMA – COMPOST NAMA – aims at facilitating Integrated Solid Waste Management and Urban Green Infrastructure approaches in six selected Ethiopian cities and towns. The NAMA is co-financed by the Global Environmental Facility (GEF), supported by UNDP and implemented by the Ministry of Urban Development, Housing and Construction.
- **Renewables:** The third NAMA focal sector is off-grid renewable energy. A NAMA proposal was prepared with funding from the German Federal Ministry of Environment, Nature Conservation, Buildings and Nuclear Safety (BMUB) and has been approved by the Ethiopian government in 2016. Non-hydro renewables have been the government's priority to diversify and expand infrastructure in the power sector. In 2014, just 25 % of households had access to electricity (IEA 2016).

Table 2: NAMA portfolio of Ethiopia

NAMA title	Sector	Type of action	Total cost (mln USD)	Finance requested (mln USD)	Finance received (mln USD)	Funder
Ethiopia Addis Ababa Light Rail Transit Oriented Development NAMA	Transport	Project	8.90	7.70		
Ethiopia Railways Establishment of Climate Vulnerability Infra-structure Investment Framework NAMA	Transport	Project	0.15	0.15		
Ethiopian Railways Railway Aca-demy NAMA	Transport	Project	0.30	0.30		
Ethiopian Green Energy NAMA	Energy	Strategy/ Policy	n/a	n/a		BMUB
Ethiopian Urban NAMA: Creating Opportunities for Municipalities to Produce and Operationalise Solid Waste Transformation (COMPOST)	Waste	Strategy/ Policy	50.20		6.67	GEF

Source: NAMA Database and UNFCCC NAMA registry

Ethiopia has also been receptive to new mechanisms and platforms for supporting market mechanisms in recent years. It signed an agreement with Japan to collaborate on the Joint Crediting Mechanism (JCM) in 2013, the same year the scheme was launched. While no projects have been registered to date, three methodologies on renewable power generation through micro hydro, solar PV and biomass combined heat and power have been approved (JCM 2017). A broad set of line ministries are part of the JCM governing body.

Ethiopia also participates in World Bank's Carbon for Development (Ci-Dev) initiative, which is supporting two POAs on off-grid solar and household energy efficiency up to 2024 with results-based payments for achieved abatement (World Bank 2015). It has not sought membership of the World Bank's Partnership for Market Readiness (PMR) yet.

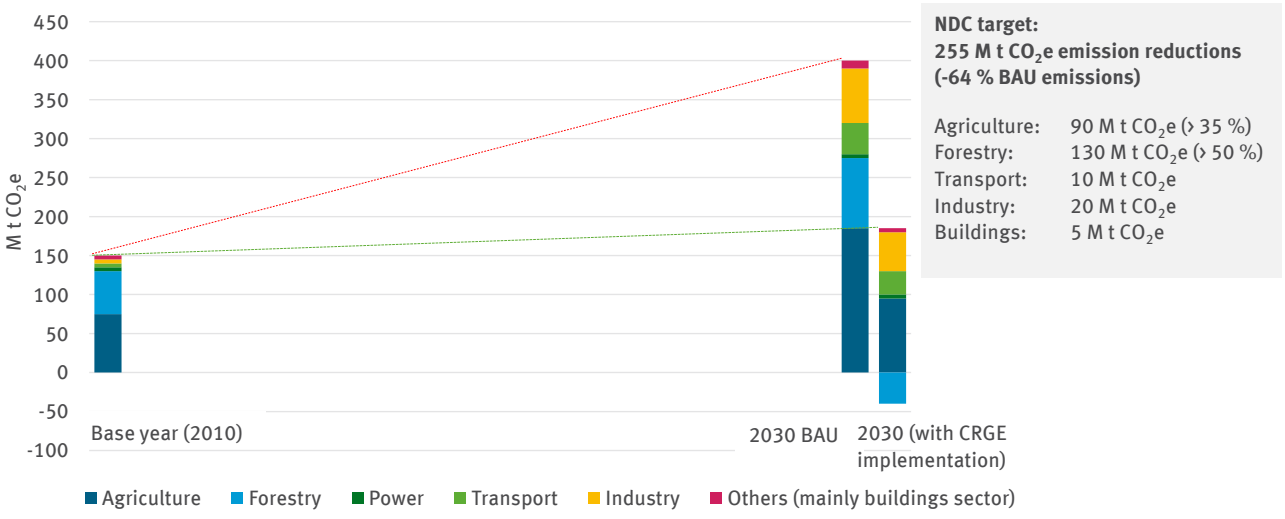
Being an LDC, Ethiopia is currently not obliged to contribute to the International Civil Aviation Organisation's (ICAO) Carbon Offsetting and Reduction Scheme in International Aviation (CORSIA). However, if it achieves middle-income status by 2025, Ethiopia will have to participate in the second phase of the scheme (2027-2035) as its share of international aviation activity already falls under the regulated range. CORSIA's second phase is obligatory to all member states whose share of international aviation activity in revenue tonne kilometres (RTK) in 2018 is above 0.5 % or whose share falls in the cumulative total of the top 90 % of international aviation emissions (when each member state is ranked from highest to lowest in terms of RTKs), except if they are LDCs, Land Locked Developing Countries and Small Island Developing States (ICAO 2016). Owing to the prominent regional and international footprint of the state owned Ethiopian Airways, Ethiopia's share to the global civil aviation in terms of RTKs was 0.6 % in the year 2012 already (ICAO 2013).

In addition to recent international market based approaches, Ethiopian leaders have also supported broader carbon pricing approaches such as carbon taxes and ETS in international platforms. In 2016, the Ethiopian Head of State joined five other country counterparts at an event for the World Bank's High-Level Panel on Carbon Pricing and called upon the international community to double the global emissions covered by explicit carbon prices to 25 % by 2020 and 50 % by 2025 (World Bank 2016a). However, developing such complex instruments domestically in the immediate future is not foreseeable according to the interviewed stakeholders.

2.3 Glance into the future: Ethiopian NDC towards the Paris Agreement

The motivation for carbon market mechanisms is also evident in how Ethiopia has positioned its contributions towards the Paris Agreement. Ethiopia submitted a single year target of reducing 255 M t CO_2e from projected 'business-as-usual' (BAU) emissions in 2030 (400 M t CO_2e). The target covers the most significant sectors. Sectoral breakdown of the Ethiopian NDC is as follows (Figure 3):

- **Agriculture sector**, including crops and livestock, is expected to contribute 90 M t CO_2e or over 35 % of the targeted reduction. This will be achieved mostly by improving efficiency of current cropping and livestock management practices and adopting low emission techniques.
- **Forestry sector** is projected to contribute over 50 % to the reduction target, mainly by reducing deforestation through efficient cook stoves, soil carbon sequestration by increasing afforestation and reforestation, and rehabilitation of degraded lands for cropping or as pastures.
- **Industries** are expected to reduce their emissions in 2030 relative to the BAU level by 20 M t CO_2e through various energy efficiency improvements. The cement sector is stated to have the most potential in the CRGE strategy.
- **Modernisation of transportation** through local and long-distance rail network development, improvements in urban bus transport in the capital city Addis Ababa and implementation of strict fuel and emission intensity standards are projected to lead to 10 M t CO_2e worth of reductions in 2030 from transport, relative to the BAU level.
- **Buildings sector** is expected to reduce its emissions in 2030 by 5 M t CO_2e relative to the BAU level. Waste generation and off-grid energy consumption are included in the sector.



Source: Redrawn based on CRGE strategy and NDC of Ethiopia (Federal Democratic Republic of Ethiopia 2011)

Figure 3: Summary of Ethiopia's emission reduction plans as per the NDC and CRGE strategy

Although not part of the contribution, the NDC notes that clean power export to neighbouring countries such as Djibouti and Kenya can lead to additional emission reductions of 19 M t CO_2e. Between 2015-2016, power exports contributed 123 million USD, or 7 %, to Ethiopia's GDP (venturesafrica 2016). No details are provided on whether this mitigation would be accounted for by Djibouti and Kenya or by Ethiopia.

Despite the limited success in generating carbon finance through CDM projects, the experience of Ethiopia with market mechanisms piqued the country's interest in market approaches and helped in developing pilot activities in most of the relevant emission intensive sectors. In the next section, Ethiopia's interest in future carbon markets is discussed along with a detailed assessment of the current domestic capacity to participate in such markets.

3 Country position and capabilities

Finance generated through carbon markets is considered a channel for mobilising international support and an important factor in achieving the ambitious targets outlined in Ethiopia's NDC and the CRGE strategy (Government of Ethiopia, 2014, p.21). With this premise, the next paragraphs provide an overview of Ethiopia's position for the use of Article 6 carbon market approaches and its domestic capacity to engage in such approaches.

3.1 Interest in using international markets and positioning on the usage of Article 6

Post-Paris market negotiations have progressed in the form of discussions on fundamental questions around the nature, design and use of market approaches. Submissions have been requested on fundamental questions such as accountability and governance of the approaches, linkages between Article 6.2 and 6.4, transparency and environmental integrity of the approaches. The first round of submissions was invited in the run-up to COP 22 and SBSTA 45 in November 2016; and the second was requested by March 2017 for discussion in an informal roundtable at SBSTA 46. Ethiopia has been active in these discussions, and participates as a member of the Least Developed Countries (LDC) group and African Group of Negotiators (AGN). It has responded to both rounds of submissions so far, independently (Government of Ethiopia 2016b; Government of Ethiopia 2016a) as well as under the LDC group (LDC group 2017a; LDC group 2017b).

The foundation of Ethiopian positioning on Article 6 is that, as an LDC, its NDC ambition falls under Article 4.6 and is conditional. Ethiopia's plan to engage in Article 6 hence focuses on leapfrogging old technologies using cooperative approaches. At present, Ethiopia sees most of its emissions reductions to serve as internationally transferred mitigation outcomes (ITMOs) to finance the leapfrogging[6]. However, there can be some small emissions reduction efforts that could be categorized as unsupported.

Ethiopia aims to actively engage in the development of rules for future markets, particularly for the Article 6.4 mechanism, to avoid design limitations of the sort that impeded its participation in the CDM. It supports the development of new modalities and procedures, but remains open to explore which rules from the current mechanisms could be replicable in Article 6.4. Their interest in rule making foresees engagement in all aspects, including first rules and standards, governance aspects, representation of members and experts, implementation, governance integrity, and accountability mechanisms; without taking any element outright from past mechanisms.

Under Article 6.2 approaches, Ethiopia identifies a clear need for NDCs to be accountable to generate and transfer ITMOs. It stresses on the need for all NDCs to be quantifiable in an absolute manner and in terms of their GHG impact, i.e. determined against a defined base year or baseline, to be considered in the Article 6.2 framework. ITMOs are expected to have a GHG metric, i.e. counted as tonnes of CO_2e. Ethiopia has also highlighted a need for harmonisation of NDCs as NDCs of different ambition levels, transparency and without a clear definition of the trajectory of the long-term target ('short-term balance sheet') can put at risk the environmental integrity of emission reductions.

Ethiopia endorses strict domestic provisions embedded in national legislations to ensure environmental integrity. Substantiating support for strict domestic structures, the Ethiopian submissions propose multilateral structures for transparency in the use of carbon markets. It is suggested that the ITMO transfers must be supervised by and recorded under a 'centralised oversight mechanism', supported by national registries under the Paris Agreement. Further, ITMOs should be accounted only once; and in both provider and acquirer countries' registries (Government of Ethiopia 2017; Government of Ethiopia 2016a). Ethiopian submissions identify the need for checking baselines at three resolutions: at the plant level to ensure comparison with peers; at the national level for comparison and compatibility with the country's NDC; and at the global level to ensure that no double counting of emission reductions occur.

Ethiopia supports setting a net mitigation contribution from both Article 6.2 and 6.4 approaches. To achieve this, high standards of quality, transparency and stringency in provisions to ensure the expected environmental integrity from Article 6 approaches is needed. It must be noted that the Paris Agreement only defines a net mitigation effect for the Article 6.4 mechanism.

6 Ethiopian carbon market negotiator, Personal communication.

3.2 Current carbon market related capabilities in Ethiopia

Current carbon market capacities in Ethiopia can be traced to two sources. Firstly, mitigation projects and programmes piloted under the CDM in desirable sectors have pioneered models for design, documentation and execution of actions in these sectors. Secondly, sectoral mitigation actions planned under the CRGE strategy have kick-started institution building and capacity development at the federal and provincial levels; and integration of scattered mitigation activities developed for carbon markets into concerted sectoral actions towards the CRGE. While these activities have increased the overall familiarity for identifying mitigation potentials and created specific capacity in some actors, several limitations remain. Particularly critical is to ratchet up capacity beyond a few champions, and develop concrete institutionalised expertise to independently undertake activities.

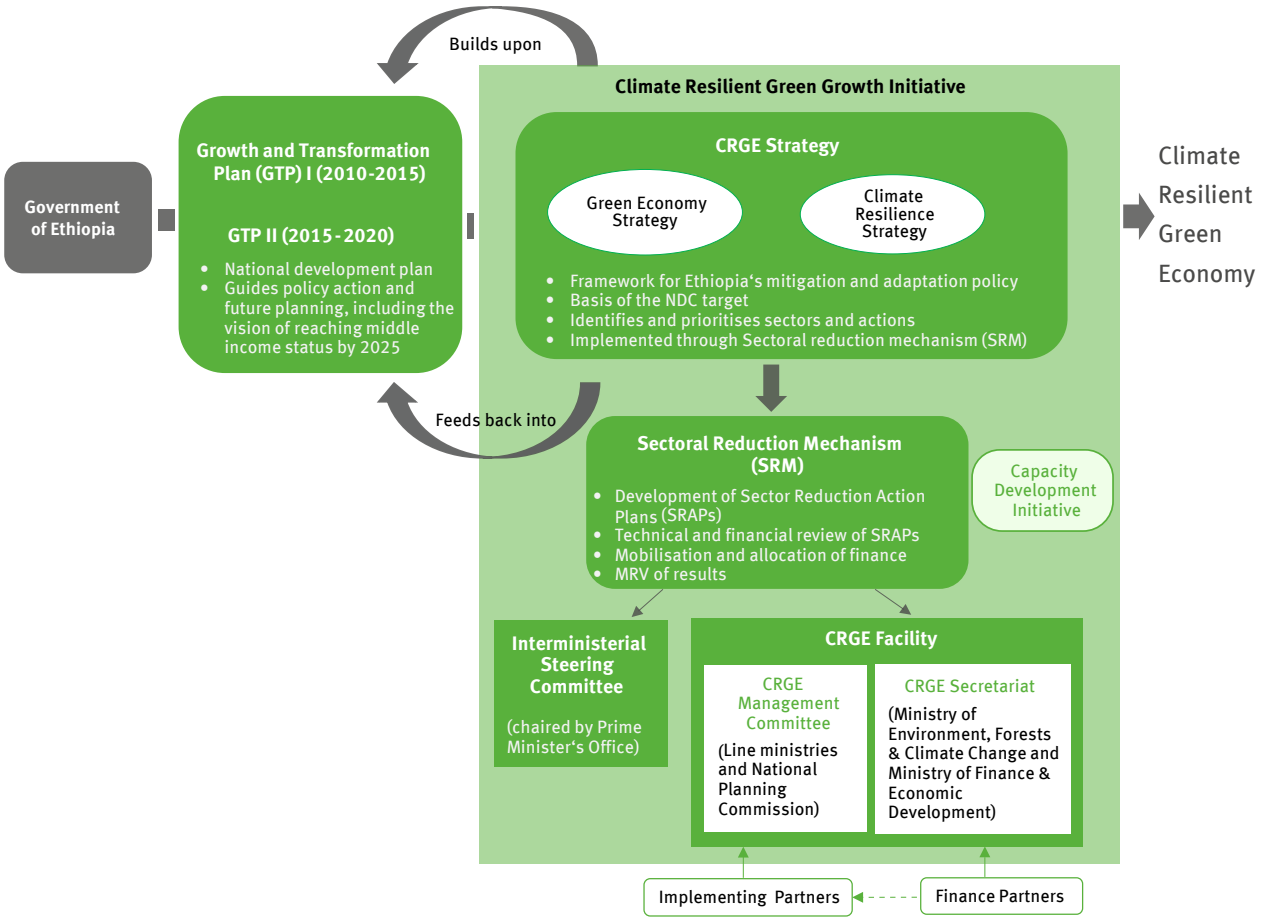
3.2.1 Domestic administrative and regulatory capacity

Technical oversight of mitigation actions under the CRGE strategy comes under the purview of the Ministry of Environment, Forests and Climate Change (MoEFCC)[7]. Its responsibilities include providing methodological guidance and defining procedures for MRV. Specific implementation responsibility rests upon sectoral ministries and designated entities in Ethiopia's national regional states, particularly in energy, agriculture, transport, industry and urban development sectors. The MoEFCC has additional coordination responsibilities and presides over tri-monthly meetings with ministries and regional agencies in charge of implementation. The meetings discuss planning issues and check the status of progress of ongoing activities under the CRGE strategy under the GTP II plan period. The CRGE strategy is being facilitated by the highest political office and the Prime Minister chairs a high-level committee overseeing its implementation, to which the MoEFCC reports.

Although a broad institutional framework exists, details of responsibilities, stakeholder relationships and coordination procedures are still under development in Ethiopia. The MoEFCC has created focussed departments (termed 'directorates') for the MRV of CRGE activities, national communications and carbon markets[8]. However, similar intra-ministerial structures are still evolving in implementing ministries (Echnoserve 2012). A few individuals in each ministry have technical expertise, deriving from their involvement in national communications and domestic strategy development. However, this capacity needs to be broadened for Ethiopia to be in a position to establish a systematic monitoring system. Institution building and knowledge at the sub-national level is also at a nascent stage. The typical mandate of regional environmental agencies has so far been environmental monitoring and impact assessment. A process of building sub-national capacities has also begun.

7 The Environmental Protection Agency (EPA) was elevated to MoEFCC following a legislative amendment in 2013.

8 Representative from MoEFCC, Personal communication.



Source: Redrawn based on information in the CRGE strategy and CRGE facility manual

Figure 4: Architecture of Ethiopia's CRGE strategy and associated institutional structures

3.2.2 Accounting capacity

Accounting capacity covers estimating national emissions, e.g. as done for national communications to the UNFCCC; and accounting for mitigation actions and related emissions reductions, e.g. from projects, programmes and sectoral actions. Accounting emissions as well as emission reductions is a prerequisite to assess progress towards national and international mitigation objectives. Accounting is a distinct but overlapping competency to MRV (discussed in the next section), with accounting focussed on how progress towards a mitigation objective is assessed and MRV focussed on monitoring progress on actions/emissions/support, gathering and sharing information/data on monitored indicators and review processes. The crucial nature of the two to ensure environmental integrity of mitigation outcomes warrants their separate discussion.

Ethiopia's latest national inventory is for the year 2013 and was developed for the second national communication. The second national communication was submitted in 2015 and prepared with the support of GEF and UNDP. However, protocols and procedures for continuous tracking of GHG emissions, and collecting and storing data are yet to be established in Ethiopia.

Accounting capacity for mitigation actions is also limited. However, some Ethiopian stakeholders are familiar with accounting in a few sectors of interest, mainly through the CDM. These match with activities fast-tracked under the CRGE, e.g. reducing emissions from deforestation and forest degradation (REDD+), in rural energy and efficient stove projects, in the power sector and from livestock. The first three are discussed below as examples.

In the forestry sector, the Humbo forest regeneration CDM project and pilots under REDD+ have together enhanced domestic public and private accounting capacities in Ethiopia. Forestry mitigation activities face specific accounting challenges for identifying carbon pools; defining baseline and leakage emissions; and monitoring the project over time. Rigorous training is also a pre-requisite.

To this effect, the approaches and methods developed under the Humbo project have been pioneering. In addition to developing technical knowhow, the project also established novel approaches for community engagement such as defining user rights and establishing community cooperatives for project management (Terefa n.d.; Brown et al. 2011). These are specifically important lessons for a country like Ethiopia which still follows traditional land tenure systems. Additional accounting capacity is also gradually being built through progress under the framework of REDD+. A national REDD+ Secretariat is currently being established to coordinate and lead the REDD+ process, supported by a technical working group and three specific task forces. Yet, actual expertise for monitoring and carbon accounting in REDD+ is still developing. For that reason, a number of capacity building activities in regional pilot projects aim to significantly raise the level of accounting expertise in the near future (CIFOR 2015). Several donors (e.g. Norway) and multilateral funding channels (e.g. World Bank's Forest Carbon Partnership Facility's Readiness Fund) are supporting the sector.

Cookstove programmes are also considered lucrative by domestic stakeholders for securing carbon financing. Over 90 % of the Ethiopian population relies on fuel wood procured mostly through unsustainable practices (Ministry of Water Irrigation and Electricity 2017). Like afforestation projects, cookstove programmes also require specific technical expertise for their design and implementation. Accounting challenges faced amongst these programmes include monitoring the use of new efficient stoves, fuel saved over the project period and the efficiency of the stove; and determining locally relevant default values for the fraction of non-renewable biomass (i.e. biomass derived from woody/non-woody sources that cannot be replenished) for estimation of emission reductions (Global Alliance for Clean Cookstoves 2017; Lee et al. 2013). Here again, Ethiopia's four registered cookstove CDM POAs have provided relevant stakeholders some understanding of accounting emission reductions from cookstove distribution programmes. Further opportunities for integrating and aligning governmental programmes with CDM type intervention are also under discussion. The Ministry of Water, Irrigation and Energy is exploring options to align the 'national efficient cookstove dissemination programme' with the Ethiopian Development Bank's ongoing cookstove POA. The POA is receiving carbon financing from World Bank's Ci-Dev initiative for CERs generated between 2016-2024.

Off-grid power is of particular interest in Ethiopia for increasing domestic energy access, considering high grid expansion costs and long implementation timeframes. Here again, pilot activities undertaken under the CDM with the support of the international community have created specific emission accounting models. For instance, the Development Bank of Ethiopia manages an 'off-grid renewable energy programme' and has signed an emission reduction purchase agreement with the Ci-Dev initiative (World Bank 2016b). A NAMA proposal for developing policies and regulations for off-grid generation, along with some pilots has also been developed in 2015 with the support of the BMUB.

Other important sectors where Ethiopians have had some relevant experiences include transportation, with modal shift railway NAMAs (details in section 2.2); and industry, particularly in the cement sector, wherein a standardised baseline for clinker production using positive lists for fuel switch, feedstock switch and technology switch have been submitted to the UNFCCC. The focus in the agriculture sector has mainly been on building resilience and promoting climate smart agriculture practices.

3.2.3 Monitoring, reporting and verification (MRV)

MRV capacity can be distinguished between MRV related to national emissions and MRV provisions for mitigation activities. In addition to the results, MRV also includes criteria to track implementation progress, effectiveness of the outcomes and support in a transparent manner.

Despite improvements in institutional capacity, Ethiopia is still far from developing a consolidated, synchronised and digitised MRV framework for national emissions. Data collection is not mandatory and specific mandates for data collection currently do not exist. Synchronisation of reporting in the national regional states is another key challenge for developing national MRV capacity. However, with varied reporting mandates and approaches in the designated ministries in regional states, developing protocols for such synchronisation has been a challenge. To alleviate barriers with regards to different reporting mandates of these agencies, MoEFCC stated that the Ministry has now successfully facilitated institutional restructuring in the regions, achieving a first and critical step towards developing a synchronised MRV framework in the country[9]. A lack of formalised and standardized protocols and procedures for data reporting and monitoring has been cited as a key challenge in the second national communication of Ethiopia (Ministry of Environment and Forest 2015).

9 MoEFCC representative, Personal communication.

MRV requirements for mitigation actions conceived as individual projects, programmes and sectoral interventions includes the development of a monitoring plan, a protocol for reporting of data and defining verification procedures. The green economy vision outlined in the CRGE strategy is materialised through a sectoral reduction mechanism (SRM) which outlines the process for delivering actions. A web-based CRGE register is already in place and working to make an inventory of proposals seeking financial support[10]. The provision of funding has also been streamlined through a CRGE facility which pools domestic and international finance; and disburses it to proposals in the registry through various financial instruments. The MoEFCC is currently working on developing procedures for MRV of actions in the SRM.

In parallel to establishing a consolidated and synchronised MRV framework for emissions and mitigation actions at the national level, efforts on the development of a robust and transparent MRV system are undertaken under the REDD+ process. In the particular context of REDD+, an MRV Roadmap was prepared in 2013 and a National Forest Inventory launched in 2014. The data collection process for the inventory is currently ongoing. Specific data and capacity gaps that were identified in the MRV Roadmap are being addressed by the REDD+ Secretariat with support from a technical working group and an MRV task force. Once the necessary capacity has been built on the ground, the REDD+ Secretariat will coordinate the full implementation of the MRV Roadmap (CIFOR 2015). A coordination mechanism could then help to link different MRV related activities and structures at different levels and inspire further MRV capacity building beyond REDD+ with a view to developing the above mentioned consolidated and synchronised MRV framework.

With this current capacity in mind, the next section discusses the framework on which Ethiopia's readiness to engage with Article 6 is assessed.

4 Assessment framework for countries' readiness to engage with Article 6

4.1 Participation options under Article 6

Article 6 of the Paris Agreement includes several provisions allowing for the use of international carbon markets to support the implementation of NDCs and enable ambition raising. These are defined as 'Cooperative Approaches' (discussed in Article 6.2-6.3) and a 'Mechanism for Sustainable Development and Mitigation' (discussed in Article 6.4-6.7). We interpret ITMOs as mitigation outcomes realised through any Article 6 approach, and transferred between countries with the objective of contributing towards the NDC of the acquiring country. While the detailed guidance and rules for Article 6's provisions are currently under negotiation, countries as well as experts are reflecting on how to best integrate experiences from previous and existing market related activities in the future mechanisms. Based on existing market experiences, a range of options for transferring mitigation outcomes may exist for countries in the post-Paris market mechanisms.

In Table 3 and the paragraphs that follow, we outline a set of broad and non-exhaustive options for transferring ITMOs and differentiate between those that may fall under Article 6.2 'Cooperative Approaches' or under Article 6.4 'Mechanism for Sustainable Development and Mitigation'. These form the basis of the assessment in section 5.

Table 3: Potential non-exhaustive options for ITMO transfers under Article 6

Options for ITMO transfers under Article 6.2 cooperative approaches (✓) and Article 6.4 mechanism (✓)	
ITMO transfers as a result of linked **Emission Trading Schemes**	✓
Direct transfers of ITMOs **between countries**	✓
Transfers of ITMOs generated **from bilateral baseline and crediting instruments** (e.g. JCM)	✓
Transfers of ITMOs generated **from international baseline and crediting instruments**	✓

Source: Authors

10 CRGE registry: http://www.ethcrge.info/home.php

Participation options under Article 6.2 - Article 6.2 encompasses direct cooperation between sovereign states that involves the transfer of ITMOs. Multiple instruments could generate ITMOs under Article 6.2 as long as their generation is consistent with the international guidance that is to be adopted by the COP. Based on currently operational domestic, as well as international, carbon pricing instruments and the outlined interpretation of ITMOs, a few broad participation options emerge:

1. *ITMO transfers as a result of linked domestic Emission Trading Schemes (ETSs):* Emission permits or corresponding ITMOs are transferred as a result of trades between established ETSs from respective jurisdictions through linking their markets.
2. *Direct government-to-government ITMO transfers:* This could take different forms. For instance, emission permits similar to assigned amount units (AAU) in the Kyoto Protocol's International Emission Trading are transferred as ITMOs.
3. *ITMO transfers as result of (bilateral) baseline and crediting instruments:* These include crediting of emission reductions in non-ETS sectors for the countries with ETSs, or a general crediting approach, or the Joint Crediting Mechanism (JCM) type bilateral crediting approach. Such instruments may operate on project-by-project or sectoral level.

Participation options under Article 6.4 - Article 6.4 establishes a Mechanism for Sustainable Development and Mitigation which generates emission reduction credits and operates under the authority of the COP. Based on engagement in operational international mechanisms and existing structures (e.g. CDM), participation in the mechanism can involve, first and foremost, the generation of emission reduction credits and their transfer between countries (and/or obligated entities e.g. in ETSs) towards meeting the acquiring country's NDC. We assume that emission reduction credits generated under Article 6.4, which are internationally transferred and used by the acquiring country towards its NDC, may potentially also be regarded as ITMOs.

4. Design options that exist under Article 6.4 are yet to be agreed and include *a project or programme based mechanism* similar to the CDM/JI approaches; or a *sectoral international crediting mechanism* in which fixed sectoral baselines/thresholds could be set and credits generated if a lower level of emissions is achieved. Alternatively, credits could be also generated by adopting, quantifying and carrying out MRV for GHG-friendly policies in particular sectors or be based on intensity-based baselines e.g. GHG emissions per unit of output.

4.2 Assessment framework for countries' readiness to engage with options under Article 6

In the absence of firm rules on the nature and form of market mechanisms possible under Article 6 of the Paris Agreement, an assessment of countries' readiness to engage with such mechanisms cannot be based on precise benchmarks. However, a readiness assessment can still take stock of the broad preconditions to engage with Article 6, identify support needs and provide important insights for ongoing negotiations and the further development of modalities for Article 6.

The indicators used in this assessment of 'engagement readiness' of countries are, first, the enabling conditions for the uptake of Article 6 market instruments *(enabling conditions)*; second, factors which ensure that the mitigation outcomes used as ITMOs follow principles of environmental integrity desirable under Article 6 *(feasibility of maintaining robust accounting and MRV; compatibility of the NDC)*. These indicators and their constituent factors are outlined in Table 4 and briefly discussed below.

1. **Enabling conditions** – We assume that pprior experience and availability of instruments such as emission trading schemes, crediting instruments and bilateral transfers play a facilitative role in Article 6 uptake. Furthermore, the Paris Agreement has redefined the paradigm for international climate policy as unlike the Kyoto Protocol (KP), all Parties have taken up some form of contributions towards global mitigation efforts. As all Parties are free to buy or sell ITMOs, market instruments can have an impact on (and be impacted by) domestic mitigation efforts. Hence, the political will of Parties to pursue domestic or international instruments, facilitate their uptake by stakeholders, and ensure quality of ITMOs will be critical in the post-Paris world.

2. **Feasibility of maintaining robust accounting and MRV** – Article 6 instruments would require strong domestic systems to supplement and strengthen internationally agreed guidance and rules to measure, monitor, report and verify the ITMOs for Article 6.2 and Article 6.4 respectively, assuming the two have comparable stringency. This includes experiences of a country, first, with economy wide emission accounting, e.g. in the form of national emissions inventories and MRV systems and prior registry experience. Second, experiences with accounting approaches for specific sectors and mitigation activities (similar to project-based crediting instruments). Additionally, the presence of appropriate institutions, e.g. a coordinating body, would be critical to maintain robust accounting and MRV. Further, interest and implementation capacity of stakeholders (e.g. businesses, NGOs, and state agencies) is important to maintain robustness of accounting and MRV provisions included in the Paris Agreement.
3. **Compatibility of the NDC** – Lastly, the relationship of ITMOs with NDCs will be critical for maintaining the environmental integrity of Article 6 instruments and strengthening the mitigation ambition of the Paris Agreement. Considering the broad range of NDCs that have been submitted to the UNFCCC, among others, aspects such as the nature (conditional or unconditional) and scope (sectoral, actions only, economy wide) of the NDC, elements of quantifiability such as clear emission trajectories and clarity of underlying actions are important. Moreover, the extent of ambition of the NDC could influence the generation of genuine emission reduction credits ('hot air').

Table 4: Indicators and factors used in readiness assessment

Indicators	Factors considered in the assessment
Enabling conditions	Availability of instruments
	Political will
Feasibility of maintaining robust accounting and MRV	Accounting capacity
	Implementation capacities
	MRV systems
	Registry experience
Compatibility of the NDC	Scope of the NDC and type of target
	Clarity of the NDC
	Nature of the NDC
	NDC ambition
	Coverage of GHGs

Sources: Authors

The next section discusses the Ethiopian case in detail using the analytical lens provided by the framework set out above.

5 Ethiopia's readiness to engage with market options under Article 6

Based on the background of Ethiopia's experience with market mechanisms and existing carbon market related capacity, the following paragraphs discuss Ethiopia's readiness to engage with potential market options discussed in section 4.1 and to identify the pathways it may choose for participating in Article 6. The analysis is classified as per the three indicators of readiness defined in section 4.2 and synthesised towards the end of the section.

5.1 Enabling conditions

Ethiopian leaders have also been vocal proponents of carbon pricing approaches on international platforms in recent years. Ethiopia's interest in future carbon markets is reflected in a strong commitment to international climate negotiations on the topic. Ethiopian negotiators are keen on engaging in rule development on both Article 6.2 and 6.4 while being open to use either or both in the future. In their words, they are in a 'wait-and-see while participating' mode. This international commitment is translated domestically in the form of clear leadership from the highest political office.

The early experiences with carbon market instruments have played a role in shaping the domestic discourse on carbon markets. Ethiopia faced many difficulties in participating in KP's flexibility instruments and could only register nine projects and POAs under CDM in a decade, with even lower issuance. Despite this, experiences with the CDM are considered to have helped in developing an aptitude for robust quantification of mitigation activities under planned policies and beyond, with an aspiration to explore carbon pricing/results-based support to incentivise future mitigation activities[11]. Markets are mentioned in crucial policy documents such as the CRGE strategy as well as in the NDC as an innovative instrument for international financing support (Government of Ethiopia 2014). Ethiopia has also been open to collaborate with international actors on mitigation projects and programmes e.g. under JCM and NAMAs. Experiences from these instruments add into the pool of gradually developing capacities towards project/programme level accounting and MRV.

Overall, the existing experience with different market based instruments, ongoing efforts and political willingness to engage in future carbon markets highlights a conducive enabling environment for participation in future markets. Experience is deeper for baseline and crediting instruments working on a project and programmatic scale, while domestic instruments such as an ETS and tax are still a low priority.

Table 5: Summary of the indicator 'Enabling conditions'

Indicators	Factors	Current situation
Enabling conditions	Availability of instruments	▸ Some experience of CDM, NAMAs, JCM
	Political will	▸ Active participation in Article 6 negotiations ▸ Highest political office coordinates CRGE

Sources: Author's assessment

5.2 Feasibility of maintaining robust accounting and MRV

Current carbon market capacities in Ethiopia come from two sources. First, mitigation projects and programmes piloted under the CDM in priority sectors have pioneered approaches for design, documentation and execution of actions in these sectors. Second, sectoral mitigation actions planned under the CRGE strategy have kick-started institution building through capacity development at the federal and provincial levels; and integration of scattered mitigation activities into concerted sectoral actions in priority sectors such as forestry, efficient cook stoves, renewable power, and transportation sectors.

11 MoEFCC representative, Personal communication.

MRV approaches are being developed in sectors prioritised in the CRGE strategy and the NDC, particularly as sub-sectoral, programmatic-scale interventions. Efforts are underway to institutionalise MRV processes in these sectors, both independently and with the support of donors. Activities so far have furthered familiarity of some domestic stakeholders for designing emission accounting and implementation protocols in priority sectors. In doing so, the country has actively engaged with multilateral agencies and gathered international support on developing accounting and MRV protocols for complex sectors such as forestry or household energy efficiency. These existing activities can serve as primers for developing projects and programmes for carbon markets in the future.

To this effect, capacities are being developed for administering and implementing mitigation actions. MOEFCC, which has previously been the CDM DNA, is emerging as the national technical regulator and coordinating body for the CRGE. The Ministry has dedicated departments for supporting MRV design and implementation of actions. Leading line ministries are also required to establish similar departments and institutional restructuring is underway in federal regions for synchronising reporting. So far, state-owned organisations, state agencies, and non-governmental organisations have been more prominent in the NDC implementation and carbon-market discussions, while private sector investment appears far less prominent and remains concentrated in a few industrial sectors such as cement. The state, and other non-state actors, may continue to assume important roles in future market instruments considering much of the mitigation potential lies in development centric sectors which can be less attractive to private agents due to higher investment risks.

Several challenges can influence the effectiveness of outcomes generated for transfers under Article 6. The first set of challenges pertains to domestic capacity. Designing interventions, accounting for emission reductions and the related MRV activities require nuanced technical and administrative capacity. In Ethiopia, such expertise is beginning to develop, but needs to be scaled-up in this transitional period for markets. The capacity of federal agencies to oversee MRV design and implementation of actions is limited to a few 'champions' who have a history of participating in different national efforts. Agencies are often understaffed to administer mitigation action at the necessary scale. Fiscal constraints to allocate such dedicated resources are identified as a critical challenge. Further, implementation capacity, particularly technical capacity to define and administer protocols for designing MRV in priority sectors; and continual data collection and monitoring progress of interventions is limited. Pockets of expertise lie with just a few actors, e.g. existing managing entities of POAs, local consultants, and active ministries. Limited private sector interest may also inhibit scaling up potential. On-going efforts in the country are working towards addressing some of these challenges. For instance, some line ministries are looking for active exchanges and collaboration with non-state actors with know-how of sectoral MRV and accounting (e.g. of CDM POA development). But such efforts need to be continued and scaled-up.

The second challenge regards systems required to effectively undertake MRV. Developing arrangements for a robust economy-wide emissions inventory will be challenging for Ethiopia as the current experience in such exercises is limited. Ethiopia's sole experience of recording economy-wide emissions is for national communications to UNFCCC. Two national communications have been submitted so far, through technical support from multilateral organisations. A lack of formalised and standardized protocols for data reporting, monitoring and QA/QC are recognised as a key challenge in Ethiopian national communications, although one must note the efforts underway to synchronise reporting, especially in the national region states, through institutional restructuring. Such robust inventories will be needed for any direct transfers based on inventory reports, for instance, by subtracting emission balances from participating Parties' inventory reports as was done for International Emission Trading under the Kyoto Protocol.

Another critical determinant of the effectiveness of mitigation outcomes is the presence of domestic systems which can transparently track ITMOs generated and transferred to avoid double counting. These systems may be the same or differ for Article 6.2 and 6.4. Cames et al. (2016) point to a range of design possibilities for Article 6.2 transparency procedures from reporting adjustments under the Paris transparency framework (Article 13) to developing registries for recording transfers. Similarly, Article 6.4 may also require an international register like that under the CDM. Whichever design approach is ultimately negotiated, transparent documentation systems at the domestic level will be critical for its efficient enforcement. While Ethiopia supports strict transparency provisions which include national registries supporting a centralised oversight mechanism, the current experience with registry systems in Ethiopia is limited to the online CRGE registry which hosts projects seeking support from the CRGE facility.

Overall, Ethiopia's MRV framework and accounting capacity seems to be developing sector by sector and mostly in NDC priority sectors. Aggregation of these individual systems into a coherent and comprehensive national framework remains a work in progress. Systems for economy-wide emission tracking are also yet to be established, limiting Ethiopia's ability to participate in direct transfers based on corresponding adjustments through robust economy-wide inventory reports in the immediate future.

Table 6: Summary of the indicator 'Feasibility of maintaining robust accounting and MRV'

Indicators	Factors	Current situation
Feasibility of maintaining robust accounting and MRV	Implementation capacity	▸ MoEFCC is emerging as a technical regulator ▸ Technical capacities in few champions ▸ Limited sub-national capacities
	Accounting capacity	▸ Limited experience of national emissions inventory development ▸ Slightly better experience of project/program level emission reduction accounting
	MRV system	▸ MRV systems developing sector-by-sector; to be aggregated at the federal level
	Registry experience	▸ No concrete registry experience, a 'CRGE register' exists but serves mostly as a portal for projects seeking support

Sources: Author's assessment

5.3 Compatibility of NDC

Clarity in the scope of activities covered by the NDC is paramount towards ensuring the environmental integrity of Article 6 (Cames et al. 2016). Having a clear and quantifiable target (in GHG terms), including transparently defined baseline emissions against which the target is set are critical for ensuring the quality of mitigation outcomes. The Ethiopian NDC is fairly clear in its scope. It defines an economy wide absolute reduction target of reducing emissions by 255 M t CO_2e from the BAU level expected in 2030 (= 400 M t CO_2e). The target is defined by adding abatement potentials in priority sectors and the interventions that will lead to this abatement are elaborated in the CRGE strategy. The growth rate assumptions for key economic sectors underlying the BAU baseline setting are also defined in the CRGE strategy, although the NDC does not mention them.

Ethiopia's NDC has a single-year target, i.e. it does not define any obligations during the period leading up to the target year. Single year targets can pose specific accounting challenges for ITMO transfers. Central to the accounting challenges posed by single-year targets is the lack of obligation in the period leading up to the target year. As single year targets do not define any intermediate milestones, the seller country can transfer ITMOs without any limitations in the vintages before the target year. They therefore have a higher potential to generate 'hot-air'. In a similar manner, a buyer country with a single year-target may need to buy fewer ITMOs than if specific obligations existed for intermediate years. Additionally, different target types can make comparability difficult between NDCs and could make international accounting extremely complicated. While Ethiopia supports disclosure of such information in their submissions to SBSTA on Article 6, the country will need to develop/disclose the emission trajectory of their NDC pledge in the near future.

In addition, ambition of an NDC can be a key determinant to the quality of generated ITMOs. The term 'quality' is used here in the context of the genuineness of a mitigation outcome being used for international transfers. A less ambitious NDC may provide more reduction credits for the same effort, for instance, by inflating the baseline (i.e. generate 'hot air'). While an assessment of the ambition of the NDC is beyond the scope of this research, independent policy assessments rate the ambition and fairness of Ethiopia's NDC as "2 °C compatible" (Climate Action Tracker 2016).

The rating indicates that Ethiopia's climate plans are within the range of what is considered to be a fair share of global effort, but is not consistent with the Paris Agreement's 1.5°C temperature limit.

Ethiopia's climate commitment for 2030 is consistent with holding warming well below 2°C, and limiting warming to 1.5°C. More so, Ethiopia's commitment does not require other countries to make comparably deeper reductions or greater effort, and is in the most stringent part of its 'Fair Share' range.

Further, the Ethiopian NDC transparently states the overall methodology for the BAU baseline used in target setting. Future growth rates used for projections are based on the GTP. Reading the NDC in conjunction with the CRGE strategy provides a comprehensive set of supporting information.

The nature of an NDC also raises important issues. Being an LDC, Ethiopia interprets its ambition in the context of the flexibility provided by Article 4.6 of the Paris Agreement. Article 4.6 states that LDCs and SIDS 'may' develop low emission development strategies keeping in mind their specific circumstances. In this context, Ethiopia sees its NDC as a vehicle for its goal to achieve a middle-income status by 2025. The NDC is conditional on the receipt of international support. As carbon finance through ITMO transfers is considered a sub-set of the international support by Ethiopian stakeholders, assuming enough demand exists, Ethiopia can in principle transfer all emission reductions planned under its NDCs through markets.

However, this possibility raises challenges for the implementation of the Paris Agreement which transcend the discussion on carbon markets. The first challenge is with regards to the risk of double counting between mitigation and finance pledges of countries. Commentators define this as a specific form of double counting, called 'double purpose' (Schneider et al. 2014); and is related to NDCs which are completely conditional or have conditional elements, i.e. where finance and technology support from developed countries is needed to help a country meet its pledge. The underlying argument is that if ITMOs transferred from conditional NDCs are subtracted from the seller country's balance sheet and subsequently used towards both the mitigation as well as support pledge of the buying country; the buyer is not supporting the host country in achieving its pledge as it will have to subtract the transferred reductions (Schneider et al. 2014). This points again towards the need for adopting clear disclosure and accounting rules for emission reductions achieved domestically and those sold or bought; as well as for support provided and received.

While it may not apply to Ethiopia owing to its LDC status, the conditional nature of NDCs points to the need to define clear rules for countries to participate in market mechanisms. Current NDC submissions give no clarity on whether ITMOs will be generated from sectors within the NDC or beyond and, if so, whether additional mitigation efforts will be undertaken to achieve the reductions proposed in the NDC. Merely deducting ITMOs from conditional NDCs without compensating for these offsets will be counterproductive to the overall objective of reducing global emissions and containing global warming. The quantum of contributions from conditional NDCs is materially large. Estimates suggest that the conditional elements in NDCs submitted so far can together lead to an additional 0.2°C decrease in global mean temperatures by the end of this century (Rogelj et al. 2016). In principle, therefore, each country should have at least an unconditional target which is more ambitious than its baseline emissions and a conditional one which can be achieved through Article 6. Then, on the international level, seller countries should report all reductions that occur domestically and the portion that is transferred; and buyer countries should also report emission reductions that occur domestically as well as the reductions bought. In addition, buyers should not report emission reductions they help facilitate under climate finance pledges towards achieving their own NDCs.

Table 7: Summary of the indicator 'Compatibility of NDC'

Indicators	Factors	Current situation
Compatibility of NDC	Scope of the NDC and target type	▸ Economy-wide, absolute reduction target ▸ Single year target
	Clarity of the NDC	▸ NDC and CRGE define clear, quantifiable targets ▸ Interventions for meeting the target clearly defined but emissions trajectory missing ▸ Supported and unsupported actions yet to be defined
	NDC ambition	▸ Sufficient as per literature
	Nature of the NDC	▸ Conditional on international support
	Coverage of GHGs	▸ CO_2, N_2O, CH_4

Source: Author's assessment

Synthesising the discussion above, Ethiopia has gained some prior experience with, and is working towards, improving the enabling conditions for future carbon markets. Current experiences include baseline and crediting approaches in the country. As section 4 describes, such instruments could be developed under the new international market mechanism to be agreed under Article 6.4 as well as under Article 6.2's Cooperative Approaches, modelled, for instance, on a JCM-type bilateral collaboration. On the other hand, domestic carbon pricing instruments are still not under consideration, limiting ITMO transfers resulting from such instruments (e.g. through ETS linking) as a market entry-point in the immediate future. Further, systems for economy wide emissions tracking are yet to be established, limiting Ethiopia's ability to participate in direct government-to government transfers that require robust inventory reports in the near future. Therefore, from the participation options discussed in section 4, **Article 6.4 mechanism or Article 6.2 approaches based on baseline and crediting instruments developed at programmatic scales appear to present the most immediate carbon market entry-point for Ethiopia. However, Ethiopia will need to work on making the link between its carbon market uptake and NDC achievement clearer.** It must be stressed here that the assessment is a first order one given the uncertainty of Article 6 negotiations and the fact that it will still take at least until 2018 (COP24) to negotiate the exact design details of the new mechanisms. Table 8 summarises this assessment.

Table 8: Potential engagement options for Ethiopia based on the readiness assessment

Options for ITMO transfers under Article 6.2 (✓) and Article 6.4 (✓)	Potential engagement options for Ethiopia
ITMO transfers as a result of **linked Emission Trading Schemes**	
Direct transfers of ITMOs **between countries**	
Transfers of ITMOs generated **from bilateral baseline and crediting instruments** (e.g. JCM)	✓
Transfers of ITMOs generated **from international baseline and crediting instruments**	✓

Source: Author's assessment

6 Recommendations

Germany continues to hold a keen interest in supporting development of rule-based and well-functioning carbon markets in its partner countries. In the post-Paris context, however, existing German cooperation in the field of carbon markets may need to be readjusted and further shaped in line with the rules and guidance being developed under Article 6. The readiness assessment undertaken in Section 5 has aimed to provide empirical evidence to this effect. It outlines the entry points for German cooperation with Ethiopia by discussing the country's readiness to engage in Article 6.

Building on the assessment, the following paragraphs provide recommendations on the prospects for future German cooperation with Ethiopia on carbon markets. Observations from the analysis which may inform the ongoing negotiations on Article 6 are also assimilated at the end.

6.1 Prospects for future cooperation between Germany and Ethiopia

Three broad areas of potential cooperation are identified:

1. Furthering in-country MRV capacity for market mechanisms
2. Focussed technical support on linkages between Article 6 and NDC implementation
3. Sharing own experiences / lessons learnt

Furthering in-country MRV capacity for market mechanisms. Ethiopia's domestic MRV framework has a sectoral focus. Hence, an entry point for international cooperation to build readiness towards future markets can be by *supporting enhanced technical readiness of sectoral actors*, both public and private. Such pools of specific sectoral capacities can be used by state actors as needed and may circumvent the constraints Ethiopia faces in staffing dedicated technical professionals in state institutions such as sectoral CRGE units and other administrative agencies. Further, there is an urgent need to develop in-country *experience in national emissions accounting*. This includes developing tools for streamlined, common emissions reporting and training for actors reporting and administering these systems. A third element is to provide *technical training* on methods and assessment approaches for both intervention specific and economy-wide emissions accounting. Currently, technical knowhow is limited and spread amongst a few high-level champions and non-state experts. Support would also be useful in raising awareness among targeted stakeholders, e.g. local agencies, private sector and local communities either implementing the interventions or potentially affected by them.

Focussed technical support on linkages between Article 6 and NDC implementation. German cooperation to Ethiopia has been largely indirect in the past. An avenue of expanding German cooperation in the future can be to provide more long-term focussed support on the linkages between Article 6 and NDC implementation. Technical support for *developing a multi-level MRV* system is one such area. Multi-level MRV systems can administer mitigation activities at the national, sectoral and intervention levels and are being discussed in some countries under the PMR. Such systems can include the infrastructure needed for MRV (e.g. IT infrastructure), regulatory frameworks, and standards etc. for undertaking MRV at different levels. Ethiopia supports such an approach in principle in its submissions to SBSTA. Further, Ethiopia could be supported to develop its experience with registry systems for documenting and tracking mitigation outcomes and associated activities. Such support could either take the form of in-country work supported by the German government or could be facilitated through Ethiopia's participation in programmes supported by the German government, such as the PMR.

Sharing experiences and lessons learnt. A third significant need identified in this research was to learn from experiences of other jurisdictions on administrative and technical issues. Specifically, Ethiopian representatives highlighted that learning from the experiences of developed countries was an extremely useful resource for countries in the early stages of developing domestic systems.

6.2 Feedback for ongoing negotiations on Article 6

Linkage between Article 6 and Article 13. The Ethiopian case highlights the currently underexplored linkages between Article 6 and Article 13 on transparency of actions and support. One such linkage relates to the question of *how ITMO transfers affect NDC implementation and global mitigation ambition*. With a significant number of countries including conditional elements in their NDCs, offsetting from conditional contributions can risk lowering the overall ambition of global mitigation and therefore requires further consideration in the ongoing negotiations. The Paris Agreement anchors these links in Article 13.7 (b) on information necessary to track progress towards NDC implementation; and Article 6.3 and 6.5 on the use of mitigation outcomes towards NDCs.

Linkage between Article 6 and Article 9. Another linkage is with Article 9 on financial support and Article 13.10 on information on support required and provided. To avoid situations where a unit is both used towards a mitigation pledge and simultaneously counted towards financial and technology pledges made under the Paris Agreement also requires a cross-article discussion on double accounting.

Discussions on these and other linked issues that affect the environmental integrity of the Paris Agreement can facilitate its effective implementation.

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