



GCCA Global Policy Event 2013

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Background document

Monitoring, reporting and verification (MRV): what implications for strengthening climate information and national monitoring systems?



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DISCLAIMER

This background document has been prepared using a subset of the very large pool of documents and information available on UNFCCC-related processes, and on information on GCCA-supported interventions available at the GCCA Support Facility. In spite of the authors' best efforts, it may contain errors and/or omissions. It is a working document prepared to provide a basis and framework for discussions at the GCCA Global Policy Event 2013, and should not be taken as a policy document nor a definitive and comprehensive review of the issues addressed. The background document reflects the views of the authors including contributions from the review team; it is not intended and should not be taken to reflect the views of the European Union.



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1. INTRODUCTION

1.1. ABOUT THE GLOBAL POLICY EVENT AND THE BACKGROUND DOCUMENT

In September 2013, the European Commission will be hosting a GCCA Global Policy Event. The 2013 Global Policy Event aims to:

- Extract lessons learned through the GCCA experience to date on various topics of relevance to the current climate negotiation streams.
- Based on experiences from the GCCA across the world, promote dialogue and exchange between practitioners and negotiators involved in the United Nations Framework Convention on Climate Change (UNFCCC) and related processes, with a view to informing the next Conference of the Parties (COP).

The Global Policy Event will explore four topics which are of critical importance to both climate negotiators and practitioners:

1. From NAPAs to NAPs, NAMAs, LEDS and DRR strategies: the role of country-led climate and disaster risk reduction mainstreaming.¹
2. Making climate finance effective: strengthening national public financial management and budgetary systems.
3. From forests to sustainable land management: creating synergies between adaptation and mitigation.
- 4. Monitoring, reporting and verification (MRV): what are the implications for strengthening climate information and national monitoring systems?**

The discussions will be informed by a series of four background documents. Each background paper will provide a snapshot of the international state of play, GCCA approaches and experience, and propose open questions to frame the discussions of the Global Policy Event.

The technical papers and outcomes from the event will feed into the 2013 GCCA yearly publication on the above subjects and a related side event at the next COP in Warsaw (November 2013).

The present paper covers the fourth topic. After an introduction in Section 1, Section 2 provides an overview of MRV requirements and the state of MRV-related negotiations in the context of the UNFCCC. On this basis, Section 3 identifies implications for developing countries' climate information and national monitoring systems illustrated with examples drawn from GCCA experience. Section 4 concludes with a few questions for discussion at the Global Policy Event.

¹ NAPAs: national adaptation programmes of action; NAPs: national adaptation plans; NAMAs: nationally appropriate mitigation actions; LEDS: low-emission development strategies; DRR: disaster risk reduction.

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1.2. ABOUT THE GLOBAL CLIMATE CHANGE ALLIANCE (GCCA)

The GCCA is the initiative of the European Union to strengthen dialogue and cooperation on climate change with developing countries most vulnerable to climate change, in particular least developed countries (LDCs) and small island developing states (SIDS).

By the end of 2013, the GCCA will comprise 45 programmes in 35 countries and across 8 regions and sub-regions within an envelope of €290 million. The GCCA provides a wealth of experience and knowledge in the areas of climate change mainstreaming into national development processes, climate change adaptation and disaster risk reduction (DRR), sustainable land management and reducing emissions from deforestation and forest degradation (REDD+), climate finance and aid effectiveness, and institutional strengthening for addressing climate change.

As the experience grows across the globe, it is critical that the GCCA ensures that the knowledge generated from its implementation informs the international climate debate.

2. MONITORING, REPORTING AND VERIFICATION IN THE CONTEXT OF THE UNFCCC

The *Bali Action Plan* (2007) calls for enhanced national and international **action on mitigation**, to be implemented in a way that is **measurable, reportable and verifiable**. It also calls for enhanced action on adaptation, technology development and transfer, and the provision of financial resources and investment to support action on mitigation and adaptation. The *Cancún Agreements* (2010) extend the concept of measurement, reporting and verification (MRV) to the financial, technological and capacity-building **support provided to developing countries** to meet their reporting obligations, implement mitigation actions and adapt to climate change. By extension, the MRV concept is also increasingly understood as encompassing other aspects of implementing the Convention.

MRV encompasses **three elements**:

- **Monitoring** refers to the tracking of: (i) greenhouse gas (GHG) emissions, emission reductions and removals by sinks; (ii) the financial, technological and capacity-building support provided to developing countries. By extension, it can also apply to the tracking of adaptation activities and their results, the positive and negative impacts of adaptation and mitigation actions, and the way in which international and domestic resources are used to respond to climate change at country level. Monitoring not only involves the use of quantitative indicators (measurement), but also encompasses more qualitative aspects (e.g. the generation of co-benefits). It involves the systematic collection, storage and analysis of data on the basis of transparent and scientifically established methodologies and procedures.
- **Reporting** refers to the commitment by Parties to the Convention to communicate, in a consistent and transparent manner, on progress made in achieving various objectives, meeting obligations and implementing various activities in the context of the Convention. To be reliable, reporting must be based on robust monitoring systems. Standardisation allows for comparisons over time and across countries, and enables the consolidation of data.
- **Verification** refers to the procedures set up to ensure that the reported information is prepared in accordance with the agreed methodologies in order to ensure accuracy, consistency and reliability of the data. Verification activities can be implemented at national level as part of a quality assurance/quality control plan and take the form of peer review or might be conducted at international level by independent experts such as the Expert Review Team in the context of the UNFCCC.

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MRV serves **two key purposes**:

- It supports **transparency, accountability** and therefore **trust building** between the Parties, enhancing the scope and chances of success of international cooperation on climate change, as well as the opportunities for developing countries to attract funding for their adaptation and mitigation activities.
- It provides **information in support of decision making**, notably for the selection, design, prioritisation, review and evaluation of mitigation and adaptation activities; for the efficient allocation of domestic and external resources; and for the assessment of the effectiveness of specific actions and the overall effectiveness of the Convention.

Section 2.1 provides an overview of key MRV processes applying to developed and developing countries, and how the latter are supported for meeting their reporting requirements under the Convention. The following sections discuss MRV-related issues, including those still in negotiation, with regard to mitigation actions by developing countries (Section 2.2), adaptation actions (Section 2.3) and the finance and support provided to developing countries (Section 2.4). To conclude this chapter, Section 2.5 discusses a few gaps and weaknesses in current MRV arrangements.

2.1. REPORTING AND VERIFICATION PROCESSES UNDER THE UNFCCC

2.1.1. A DIFFERENTIATED APPROACH FOR DEVELOPED AND DEVELOPING COUNTRIES

The Convention requires all Parties to develop and periodically update **national inventories of GHG emissions by sources and removals by sinks** for all GHGs not controlled by the Montreal Protocol² – and to report to the COP, through **national communications**, on steps taken or envisaged to implement the Convention. The *Cancún Agreements* enhance reporting requirements for both developed and developing country Parties by requiring the submission of, respectively, **biennial reports** and **biennial update reports** as from 2014. Yet, reporting and verification requirements³ remain different for developed countries⁴ and developing countries⁵ in some respects. Table 1 summarises key differences. There is an ongoing debate on how to achieve consistency between developed and developing countries' accounting and reporting systems (see next sections), and the trend is towards gradual convergence.

² Montreal Protocol on substances that deplete the ozone layer, adopted in 1987. This protocol organises the phasing-out of some ozone-depleting substances that are also gases with a high global warming potential.

³ Note that the "review processes" briefly described in Table 1 correspond to international verification arrangements under the Convention.

⁴ More specifically, "Annex I Parties", i.e. the industrialised countries listed in Annex I to the Convention, including economies in transition from central and eastern Europe of which the Russian Federation.

⁵ This group, made up of all parties to the Convention not listed in Annex I, includes emerging economies as well as less developed countries.

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Table 1 – Overview of key reporting and review processes for developed and developing countries

	Developed countries (Annex I Parties)	Developing countries (non-Annex I Parties)
National GHG inventories		
Periodicity	<ul style="list-style-type: none"> Annual 	<ul style="list-style-type: none"> Submitted in conjunction with, and as a component of national communications (see below)
Scope	<ul style="list-style-type: none"> Must cover emissions and removals associated with 6 GHGs⁶ in relation to 6 sectors or source categories⁷; reporting on other GHGs strongly encouraged Should include data for all years from the chosen base year (1990 in most cases) onwards Countries that have ratified the Kyoto Protocol (KP) must provide extra information to report on their use of the 3 Kyoto market-based mechanisms⁸ and demonstrate compliance with KP requirements 	<ul style="list-style-type: none"> Should provide estimates for CO₂, CH₄ and N₂O; reporting on other GHGs encouraged “as appropriate” 1st national communication to be based on 1994 or 1990 data, 2nd one on 2000 data
Methodologies and uncertainty	<ul style="list-style-type: none"> IPCC⁹ guidelines and good practice guidance <u>must</u> be used;¹⁰ national methodologies also allowed if compatible with the above, well documented and scientifically based Quantitative estimates of uncertainty to be provided for all GHG source and sink categories 	<ul style="list-style-type: none"> IPCC guidelines <u>should</u> be used; the use of IPCC good practice guidance is encouraged The provision of information on uncertainty and underlying assumptions is encouraged
Quality assurance and control (QA/QC)	<ul style="list-style-type: none"> QA/QC plan to be developed and implemented in compliance with IPCC good practice guidance 	<ul style="list-style-type: none"> No specific requirements
Reporting format	<p>Standardised format including:</p> <ul style="list-style-type: none"> Common reporting format (CRF) tables presenting mainly numerical data and results from inventory estimates National inventory report (NIR) describing methodologies, emission factors and activity data used to estimate emissions 	<ul style="list-style-type: none"> No specific reporting format imposed, but the use of tables contained in IPCC guidelines is encouraged

⁶ Namely carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

⁷ Namely energy, industrial processes, solvent and other product use, agriculture, land use, land use change and forestry (LULUCF), and waste.

⁸ These include emissions trading, the Clean Development Mechanism, and Joint Implementation. For more information, see http://unfccc.int/kyoto_protocol/mechanisms/items/1673.php.

⁹ Intergovernmental Panel on Climate Change.

¹⁰ IPCC methodologies include the revised 1996 *IPCC guidelines for national GHG inventories*, *IPCC good practice guidance and uncertainty management in national GHG inventories*, and *IPCC good practice guidance on LULUCF*.

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	Developed countries (Annex I Parties)	Developing countries (non-Annex I Parties)
	and removals, emission trends, uncertainties, and QA/QC procedures	
Review process	<ul style="list-style-type: none"> • Annual • “Initial check” and “synthesis and assessment” conducted by the UNFCCC Secretariat, then “individual review” by a team of independent experts, leading to the preparation and publication of a review report • Particularly stringent review process for aspects related to KP implementation, with the possibility for experts to recommend an adjustment in the GHG inventory and/or a correction to the Party’s holding of KP units 	<ul style="list-style-type: none"> • No independent expert review (see process for national communications)
National communications (NCs)		
Scope	<ul style="list-style-type: none"> • Mitigation, adaptation and support provided 	<ul style="list-style-type: none"> • Mitigation, adaptation, support needed and received
Periodicity	<ul style="list-style-type: none"> • So far at dates set by the COP, with 6th NCs due by 1 January 2014 • Every 4 years afterwards 	<ul style="list-style-type: none"> • No fixed dates, and until recently no imposed periodicity • <i>Cancún Agreements</i> now require submission every 4 years, with some flexibility for LDCs and SIDS
Key elements	<p>NCs must include all of the following elements:</p> <ul style="list-style-type: none"> • National circumstances and how they affect GHG emissions and removals • GHG inventory data (summary) • Detailed description of all mitigation policies and measures, incl. estimates of their impact on GHG emissions and removals • Projected emissions at various time horizons “with measures” and ideally also “without measures” and “with additional measures” • Vulnerability and adaptation: expected impacts and action taken to address them • Financial and technical support, incl. transfer of technology, provided to developing countries • Actions relating to research and systematic observation • Actions relating to education, training and public awareness • Countries that have ratified the Kyoto Protocol must provide extra information to report on their use of the 3 Kyoto market-based mechanisms and demonstrate compliance with KP requirements 	<p>NCs should ideally include the following elements (with more flexibility than for Annex I Parties on the level of detail and comprehensiveness of reporting):</p> <ul style="list-style-type: none"> • National development priorities, objectives and circumstances • GHG inventory (see above) • Vulnerability and adaptation assessment, and programmes containing measures to adapt to climate change • Programmes containing measures to mitigate climate change • Transfer and/or development of technologies and know-how, including enabling environment • Capacity building activities • Actions relating to research and systematic observation • Actions relating to education, training and public awareness • Constraints, gaps, financial, technical and capacity-building needs

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	Developed countries (Annex I Parties)	Developing countries (non-Annex I Parties)
Review process	<ul style="list-style-type: none"> Comprehensive review by a team of independent experts, leading to the preparation and publication of a review report 	<ul style="list-style-type: none"> No comprehensive review and no publication of individual review reports
Biennial (update) reports¹¹		
Deadline for submitting first report	<ul style="list-style-type: none"> January 2014 	<ul style="list-style-type: none"> December 2014
Scope	<ul style="list-style-type: none"> Mitigation and support provided 	<ul style="list-style-type: none"> Mitigation, support needed and received
Key elements	<ul style="list-style-type: none"> GHG emissions and trends Quantified economy-wide emission reduction targets Progress in achieving them Updated emission projections for 2020 and 2030 Provision of financial, technological and capacity-building support to developing countries 	<p>Updates since the last NC on:</p> <ul style="list-style-type: none"> National circumstances and institutional arrangements relevant to the preparation of NCs National GHG inventory NAMAs and their effects Domestic MRV arrangements for NAMAs Support needed and received
Reporting format	<ul style="list-style-type: none"> Reporting based on guidelines adopted at COP17 (Durban, 2011), which make most provisions mandatory Common tabular format adopted by COP18 (Doha, 2012) 	<ul style="list-style-type: none"> No standardised format, but the use of standard IPCC tables is encouraged for GHG inventory updates Reporting based on guidelines adopted at COP17, allowing some flexibility to take account of capacities (many good practices are encouraged rather than made mandatory)
Assessment process	<ul style="list-style-type: none"> International assessment and review (IAR) in 2 steps: first a technical review resulting in the publication of a country-specific report; then a multilateral assessment of developed countries' progress towards the achievement of their emission reduction targets Modalities and guidelines adopted by COP17 	<ul style="list-style-type: none"> International consultation and analysis (ICA) in 2 steps: first a technical analysis conducted by technical experts in consultation with the country concerned, resulting in the drafting of a summary report; then a "facilitative sharing of views" Modalities and guidelines adopted by COP17 Flexible provisions for LDCs and SIDS

¹¹ Biennial reports for Annex I Parties, biennial update reports for non-Annex I Parties.

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2.1.2. FINANCIAL AND TECHNICAL SUPPORT FOR THE PREPARATION OF REPORTS BY DEVELOPING COUNTRIES

COP5 (Bonn, 1999) established the **Consultative Group of Experts (CGE)** on national communications for non-Annex I Parties to improve and support the process of preparation of national communications by developing countries. Key activities of the CGE include the development of training materials, the delivery of training workshops and the development of e-learning programmes. The **Global Environment Facility (GEF)** provides financial support for the preparation of national communications and now also biennial update reports. Financial and technical support for the preparation of reports is also available through other bilateral and multilateral programmes.

UNDP and UNEP are managing a *National Communications Support Programme (NCSP)*¹² that operates with funding from the GEF. A recent evaluation found that the NCSP was effective in delivering products and services in a responsive manner and met the needs of countries that requested assistance. However, respondents to the survey recommended the development of a more effective approach for **capacity building**, better **tailored to specific national contexts**. The evaluation also revealed a **need for enhanced linkages between national communications and national development policies**, to create an enabling environment for mainstreaming climate change at the national level.¹³ To replace the NCSP, UNDP and UNEP are now proposing a *Global Support Programme (GSP) for the preparation of national communications and biennial update reports by non-Annex I Parties*, to be administered jointly as from September 2013.

2.2. MRV OF MITIGATION ACTIONS UNDERTAKEN BY DEVELOPING COUNTRIES

Reliable **MRV of global GHG emissions**, based on accurate, consistent and internationally comparable data, is essential to determine the magnitude of the collective effort required, to identify the level of effort to be made by individual Parties according to their responsibilities and national circumstances, and to monitor compliance with emission reduction pledges.

UNFCCC negotiations are currently focused on the preparation of a **new multilateral, legally binding agreement** to be concluded by 2015 with a view to it entering into force in 2020. A robust and credible MRV system is needed to generate the high level of trust between Parties that is required to achieve and then implement such an agreement. In the meantime, negotiations on the MRV of NAMAs (Section 2.2.1) proceed in parallel with negotiations on specific MRV arrangements for the results for REDD+ activities (Section 2.2.2), and developing countries are acquiring MRV-related skills in the context of the Clean Development Mechanism, as briefly described in Section 2.2.3.

2.2.1. NATIONALLY APPROPRIATE MITIGATION ACTIONS (NAMAS)

The *Bali Action Plan* calls for developing countries to prepare and implement NAMAs in the context of sustainable development, supported and enabled by technology, financing and capacity building, in a **measurable, reportable and verifiable** manner.

The *Cancún Agreements* specify that:

¹² See <http://ncsp.undp.org/>.

¹³ On this topic, see the background paper entitled *From NAPAs to NAPs, NAMAs, LEDS and DRR strategies: the role of country-led climate and disaster risk reduction mainstreaming*.

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- **Internationally supported mitigation actions** will be **measured, reported and verified domestically** and will be **subject to international MRV** in accordance with guidelines to be developed under the Convention.
- **Domestically supported mitigation actions** will be **measured, reported and verified domestically** in accordance with **general guidelines** to be developed under the Convention.

To promote mitigation actions, “various approaches, including opportunities for using markets” are currently being investigated, “bearing in mind different circumstances of developed and developing countries”. COP17 (Durban, 2011) and COP18 (Doha, 2012) decisions emphasise the need for all such approaches to meet standards that deliver real, permanent, additional and verified mitigation outcomes, avoid double counting of effort and achieve a net decrease and/or avoidance of GHG emissions. This has implications for **internationally supported NAMAs**. It has been agreed that the MRV of such NAMAs would be governed by new guidelines for biennial update reports and the related international consultation and analysis process. However, a number of Parties suggest that common (rather than differentiated) accounting rules for measuring mitigation achievements are needed, notably to underpin the functioning of market-based mechanisms. The integrity of accounting procedures across market-based and non-market-based mechanisms also needs to be ensured. This calls for **enhanced convergence** of the MRV processes and procedures related to mitigation actions undertaken by developed and developing countries.

As far as **domestically supported NAMAs** are concerned, work is under way to develop **general guidelines** for domestic MRV. It has been agreed that these guidelines should be “general, voluntary, pragmatic, non-prescriptive, non-intrusive and country-driven, take into account national circumstances and national priorities, respect the diversity of NAMAs, build on existing domestic systems and capacities, recognise existing domestic MRV systems and promote a cost-effective approach”. Negotiations on this topic are ongoing, and further work is needed in order to ensure that the guidelines will deliver on key aspects such as a minimum level of harmonisation, the use of international best practice (with regard to institutional arrangements as well as methodologies and processes), and laying out basic requirements for robust and reliable domestic MRV systems.

2.2.2. REDUCING EMISSIONS FROM DEFORESTATION AND FOREST DEGRADATION (REDD+)

The concept underlying REDD+ is that developed countries provide financial support to developing ones which demonstrate reduced emissions from deforestation and forest degradation as measured against a pre-defined “**reference level**”, i.e. the baseline against which emission reductions and removals will be assessed. Reference levels can be set using a variety of approaches and criteria. In practice, developing countries are invited to determine their reference level on the basis of a **methodology of their own choice**, in conformity with a set of now **agreed principles**. Various COP decisions invite them to establish forest reference emission levels and/or forest reference levels “taking into account historic data” and in a way that is consistent with national GHG inventories – with the possibility of making adjustments for national circumstances. A stepwise approach to the establishment of reference levels is admitted, allowing for the use of improved data and methodologies as they become available, and sub-national reference levels may be established as an interim measure. The principle of periodic updates of reference levels is also acquired.

Guidelines for the submission of information on reference levels were approved at COP17 “for the purpose of allowing a technical assessment of the data, methodologies and procedures used in the construction of reference levels”. These guidelines insist on the need for “transparent, complete, consistent and accurate information, including methodological information”. Discussions are still ongoing about the **modalities for technical assessment of proposed reference levels**. This is important, since this technical assessment will presumably provide a basis for validating or requesting improvements in proposed reference levels, and will thus play an important role in

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establishing the credibility of REDD+ as a mechanism that truly contributes to global emission reductions.

General principles governing REDD+ monitoring and reporting have been agreed. Based on a COP15 decision (Copenhagen, 2009), developing countries are now requested (rather than just “invited”, as was previously the case) to use the most recent IPCC guidance and guidelines¹⁴ as a basis for estimating anthropogenic forest-related GHG emissions and removals, forest carbon stocks and forest area changes. They are also asked to identify drivers of deforestation and forest degradation resulting in emissions, and the means to address these; identify activities that result in reduced emissions and increased removals, and stabilisation of forest carbon stocks; and establish “according to national circumstances and capabilities” robust and transparent national forest monitoring systems.

Detailed modalities for the establishment of forest monitoring systems and for REDD-related MRV are still in negotiation, with the objective of adopting a decision at COP19 at the end of 2013. Draft text points out, among other aspects, to the need for consistency with guidance on the MRV of NAMAs undertaken by developing countries, the need for capacity development, and the need for consistency of data over time and with the established reference levels. In the current (draft) proposal, reporting on the results of REDD+ activities would be included in biennial update reports. Modalities for verification are still in discussion.

2.2.3. MRV PROVISIONS UNDER THE CLEAN DEVELOPMENT MECHANISM

The **Clean Development Mechanism (CDM)** is a mechanism set up **under the Kyoto Protocol** by which developed countries can support climate change mitigation projects in developing countries, and use the resulting **certified emission reductions (CERs)** to meet part of their emission reduction targets. The CDM contributes to the financing of projects and in some cases to technology transfers in the field of energy efficiency and renewable energies (approx. three-quarters of registered projects so far), waste management, abatement of industrial gases, agriculture, mining, and to a lesser extent afforestation/reforestation and transport.

In practice, CDM projects and programmes of activities¹⁵ must be based on **emissions baseline and monitoring methodologies** approved by the CDM’s Executive Board. Project and programmes promoters may either make use of already approved methodologies, or propose new ones – in which case project/programme validation and registration is postponed until the new methodology(ies) has/have been approved. Methodologies can be more or less complex depending on the nature of the proposed mitigation actions, but tend to be more rather than less complex as they must demonstrate the reality, additionality and permanence of proposed and actual emission reductions and removals against a credible “business-as-usual” scenario.¹⁶

¹⁴ The IPCC guidance most relevant to REDD+ is the *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, which complements the more general *IPCC Guidelines for National Greenhouse Gas Inventories*.

¹⁵ Programmes of activities (PoAs) are a mechanism under the CDM that supports a programmatic approach to the implementation of emission reductions, allowing the implementation of projects that contribute to a specific policy or objective, or just projects of a similar nature, under a single programme rather than as standalone projects. One a PoA has been registered, component project activities can be added without undergoing the complete (rather long and complex) CDM project cycle. This promotes scaling up and helps reduce transaction costs.

¹⁶ Complex methodologies often reflect concerns about the environmental performance of the CDM, and a willingness to ensure that only real, additional and permanent emission reductions are credited, in a field still characterised by a lot of uncertainties.

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The **complexity of CDM methodologies**, and the **high transaction costs** incurred for the registration and subsequent monitoring of project activities and for the verification and certification processes associated with the issuance of CERs, have frequently acted as a **barrier to CDM participation**, especially for LDCs and SIDS.¹⁷ Nevertheless, thanks to simpler baseline and monitoring rules for small-scale methodologies, the use of default values and standardised baselines, and positive lists for micro-scale projects and programmes of activities, CDM participation by LDCs and SIDS is slowly picking up, and it provides **opportunities for some countries to get familiar with the implementation** (and sometimes the development) **of MRV methodologies** that can also be useful in the context of NAMAs.

2.3. MRV OF ADAPTATION ACTIONS

The *Nairobi work programme on impacts, vulnerability and adaptation*, launched in 2005, supports the enhancement of capacities to understand impacts, vulnerability and adaptation responses and to identify and implement practical, effective adaptation actions; it also promotes the dissemination of knowledge and best practices derived from their implementation. However, so far, **no specific work programme has been set up to establish a harmonised framework for the MRV of adaptation activities** – even though the topic is occasionally mentioned in the context of workshops and other work under the Convention. Reporting on adaptation activities implemented by developing countries, including progress made, achievements, lessons learned and challenges, is left to “existing channels” (i.e. primarily national communications).

The **monitoring and evaluation of adaptation actions** is particularly important for developing countries because it is needed to identify effective, efficient measures and allocate scarce resources to those actions that are most likely to increase resilience to climate risks in a way that also supports their short- and long-term development objectives. In practice, the monitoring and evaluation of adaptation actions involves **specific technical challenges**, including:

- the **setting of clear adaptation-related objectives**, in a context in which adaptation, disaster risk reduction and development frequently overlap (e.g. actions that address the drivers of vulnerability and enhance adaptive capacity typically generate a mix of developmental and adaptation benefits);
- the **choice of adequate, verifiable adaptation-specific indicators and targets** to measure progress in achieving these objectives, in a context characterised by:
 - the **lack of a universal indicator** for performance measurement;¹⁸
 - the **uncertainty of climate projections** (in relation to the timing, intensity and in some cases even the direction of anticipated changes), which makes it difficult to establish the baseline scenario (“without adaptation measures”) against which adaptation actions are assessed may cause it to change;
 - the potentially **complex determinants** of the expected outcomes of an adaptation action, where climate change operates in combination with other stress factors in a complex socioeconomic and/or natural environment, making it difficult to ascribe success or failure to the adaptation action concerned;

¹⁷ For specific issues related to participation in afforestation/reforestation projects under the CDM, see the background paper entitled *From forests to sustainable land management: creating synergies between adaptation and mitigation*.

¹⁸ In the field of mitigation, the primary performance (excluding the assessment of socioeconomic and environmental impacts) of all actions can be measured in tonnes of carbon-dioxide equivalent not emitted or absorbed, allowing for comparisons across various types of actions. This is not the case in the field of adaptation, where performance can be measured against a wide range of criteria depending on context-specific needs and priorities.

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- the **extended timeframe** over which climate change occurs, which may lead to very different conclusions depending on the moment at which the assessment is undertaken¹⁹, and requires monitoring and evaluation to be undertaken over much longer periods than is typically the case for projects or even programmes.

In practice, various multilateral and bilateral initiatives and programmes, such as the World Bank-managed Pilot Program for Climate Resilience and also the GCCA (see Table 2, Section 3), are working on these issues and helping developing countries set up a framework for monitoring and reporting on adaptation – so far without specific methodological guidance adopted under the Convention.

2.4. MRV OF THE FINANCE AND SUPPORT PROVIDED TO DEVELOPING COUNTRIES

According to the terms of the Convention and subsequent decisions by the COP, developed countries are expected to provide financial resources, support for technology development and transfer, and capacity-building support at a level that is adequate to ensure developing countries can meet the costs associated with their reporting obligations under the Convention and the implementation of adaptation and mitigation measures.

Considering pledges made in Copenhagen by developed countries to jointly mobilise US\$ 100 billion per year by 2020 to address the needs of developing countries²⁰ in the context of meaningful mitigation actions and transparency on implementation, and in view of the negotiation of a new global climate change agreement, there is an increasing sense of urgency relating to the establishment of a reliable MRV system. Such a system should allow **tracking flows of climate finance and other support** provided, and monitoring compliance with pledges of financial support and with the principle of “additionality” of climate-related support with regard to development support.²¹ “Transparency of support”, a term sometimes used to refer to the MRV of the mechanisms by which financial resources are mobilised, transferred and made accessible to developing countries, is also a key confidence-building aspect of the ongoing negotiation process.

Besides the information made available through national communications and biennial reports, an important tool for the MRV of support is the **registry of NAMAs** in view of its role in facilitating the provision of support to NAMAs. A fully operational prototype of the registry was launched in April 2013 and a final web version is envisaged to be released in October 2013.²² At the moment, the registry contains information on both NAMAs seeking support for implementation (projects and programmes formulated by developing countries) and on support available (origin and amount of funding available to finance specific NAMAs).

¹⁹ For example, the construction of a dyke to protect a coastal area from sea level rise may be perceived as unnecessary in the short term (as the rise in sea levels remains very modest), effective in the medium term (when it actually offers protection against a rising sea), and inadequate in the long term (if the rise in sea level exceeds what had been anticipated).

²⁰ See the background paper entitled *Making climate finance effective: strengthening national public financial management and budgetary systems*.

²¹ A key concern of developing countries is that an increase in climate-related funding is offset by a decrease in development aid – hence the requirement for “new and additional” resources to be dedicated to climate change.

²² See https://unfccc.int/cooperation_support/nama/items/7476.php.

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2.5. GAPS AND WEAKNESSES IN CURRENT MRV ARRANGEMENTS

MRV arrangements under the Convention are still work in progress, and are characterised by a number of gaps and weaknesses that will need to be addressed as part of negotiations on the new international climate agreement:

- **Monitoring and reporting of GHG emissions and mitigation activities**

Given the flexible timetable for the preparation and submission of national communications and GHG inventories by developing countries²³, as well as the lack of a common measurement framework and differences in the reporting formats used by developed and developing countries, it is **not possible at the moment to consolidate data on emissions, mitigation actions and their expected results at a global level**. Guidelines for the MRV of NAMAs undertaken by developing countries are more general than comparable guidelines for the MRV of mitigation activities undertaken by developed countries, and differentiated MRV requirements do not at this stage support international comparisons and consolidation. Attempts to develop an appropriate MRV framework are complicated by the diversity of NAMAs and the lack of a common framework for emission targets.

- **Monitoring, evaluation and reporting of adaptation**

Because a significant share of the resources (both domestic and external) dedicated to developing countries' climate response address adaptation priorities, or target activities that generate a mix of mitigation and adaptation benefits, increasing attention is being paid to the relevance and cost-effectiveness of such activities. **A more systematic approach to, and methodological guidance for, the monitoring, evaluation and reporting of adaptation actions would be useful** both to facilitate the identification of good practices and to support the scaling up of adaptation support.

- **Tracking and reporting of support**

Several aspects are still to be defined as regards tracking and reporting on developed countries' obligation to provide financial, technology-related and capacity-building support. In particular, there is **no agreed definition of what constitutes "climate finance" and "new and additional" funding**. Climate finance and other forms of climate-related support are frequently associated with official development assistance (ODA) activities, and are in part provided through non-specific ODA channels, so that it is difficult for developed countries to establish the specific amounts of climate-related support provided. While the OECD Rio-marker system and guidelines on the tracking of climate-related support in ODA interventions²⁴ represent a step forward, they still fall short of providing a method for determining exact amounts. Furthermore, it is now generally accepted that funding to meet the US\$ 100 billion/year commitment will have to come from a wide variety of sources including private sector investment – but **harmonised methodologies to track and report on private financial flows remain to be developed**.

²³ The decision to harmonise the frequency of submission of national communications, and the introduction of biennial reporting requirements, partly address the issue of infrequent reporting so far.

²⁴ See OECD-DAC (2011) *Handbook on the OECD-DAC Climate Markers*. Organisation for Economic Cooperation and Development, Paris. The methodology involves the use of statistical codes to monitor the flows of aid resources targeted at climate change adaptation and mitigation, dividing interventions into three categories: those that do not target climate change, those in which adaptation or mitigation is a significant objective, and those in which it is the principal objective.

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Developing countries also experience **difficulties in identifying and disaggregating the climate-related support** they receive; information on **climate-related private investment** is particularly difficult to collect.

- **Verification arrangements**

The review process under the UNFCCC and Kyoto Protocol has the objective of assessing if emission data were determined and reported according to agreed methodologies and guidelines. It is currently not within the scope of arrangements under the Convention to examine implementation further than assessing GHG inventories and determining whether emissions are decreasing, as the **current review processes are focused on compliance with reporting requirements rather than implementation as such.**

3. IMPLICATIONS FOR DEVELOPING COUNTRIES, AND GCCA APPROACHES AND EXPERIENCE IN ADDRESSING THEM

The vast majority of GCCA-funded projects contribute in one way or another to the development and strengthening of climate-related monitoring and reporting systems.²⁵ Table 2 provides an overview of the focus of GCCA projects in this area:

- Whether at the national level (see Box 1, Section 3.1) or the sector level (see Box 2, Section 3.1), GCCA support for MRV may relate to one or several of the various elements of a climate monitoring system (see Table 3, Section 3.2), including climate variability and change, vulnerability and adaptation, mitigation (see examples specific to REDD+ in Section 3.5) and/or the allocation of resources to climate-related priorities (also known as the “tracking of climate finance” – see Box 3, Section 3.1).
- From a functional point of view, the GCCA helps partner countries address the technical and technological requirements for climate-related MRV (see Section 3.2), and promotes institutional and capacity building in support of MRV (see Section 3.3). A number of regional interventions complement efforts undertaken at country level by helping create economies of scale and regional synergies (see Section 3.4).

Sections 3.1 to 3.5 provide more details and illustrations of GCCA activities.

²⁵ GCCA activities focus mainly on monitoring rather than on reporting. However, monitoring provides a foundation for reporting as well as verification, including in the context of REDD+.

MRV: what implications for strengthening climate information and national monitoring systems?**Table 2 – Focus of GCCA projects supporting the strengthening of climate-related monitoring systems**

Country / Region	Climate variability & change	Vulnerability & adaptation	Mitigation	Climate finance tracking	Techn(ological) support	Institutional support & general capacity building
Africa (ClimDev)	√	√	(√)		√	
Bangladesh	√	√			√	√
Benin		√	(√)		√	
Belize		√				√
Bhutan		√	√	(√)	√	√
Burkina Faso		√	√			√
Cambodia		√	√	√		√
Caribbean	√	√	√		√	√
Central African Republic			√		√	√
Chad		√	√		√	√
Comoros		√	(√)		√	√
DR Congo			√		√	√
Eastern and Southern Africa		√	√		√	√
Eastern Caribbean		√			√	
Gambia		√			√	√
Guyana		√	√		√	
Haiti		√			√	√
Jamaica		√			√	√
Lesotho		√	√			√
Lower Mekong Basin	√	√			√	
Maldives		√	√		√	√
Mali			√		√	√
Mauritania	√	√			√	√
Mozambique		√				√
Myanmar	√	√			√	√
Nepal	√	√			√	√
Pacific		√			√	√

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Country / Region	Climate variability & change	Vulnerability & adaptation	Mitigation	Climate finance tracking	Techn(ological) support	Institutional support & general capacity building
Papua New Guinea			√		√	√
São Tomé and Príncipe		√				√
Senegal		√			√	
Sierra Leone			√		√	
South Pacific		√	√			√
Tanzania		√				√
Timor-Leste	√	√			√	
Uganda		√			√	√
Vanuatu		√			√	√
Western Africa		√			√	√

Areas of support marked (√) are less prominent than those marked ✓.

For more detailed information on GCCA-supported projects, please refer to the GCCA website (www.gcca.eu/technical-and-financial-support).

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3.1. STRENGTHENING CLIMATE-RELATED MRV IN THE CONTEXT OF NATIONAL DEVELOPMENT AND MONITORING SYSTEMS

While the MRV obligations of developing countries remain lighter than those applying to developed countries, and more flexibility is granted to take account of national circumstances, development priorities, capacities and the availability of support, the tendency is to gradually strengthen these requirements, notably in terms of frequency of reporting, comprehensiveness and reliability. The use of internationally recognised guidelines and methodologies is strongly encouraged or even required (in the case of REDD+ monitoring and reporting). The new multilateral climate change agreement in 2015 will need to aim for the **convergence of MRV requirements**.

Such convergence could build on the experience already gained by several developing countries from participating in the Clean Development Mechanism (see Section 2.2.3). Some countries have already built up strong capacities to apply rigorous methodologies to measure the emission reductions associated with various types of mitigation measures, and are building up their monitoring and reporting systems accordingly.

In such a context, it is paramount for developing countries to gradually build up and strengthen their climate-related monitoring systems with a **long-term, strategic vision**, in a way that supports both **short- to medium-term MRV requirements under the Convention** and simultaneously serves **national development objectives and priorities**.

These efforts can usefully be underpinned by the following principles:

- Climate-related monitoring systems should **support national decision making with respect to climate change adaptation and mitigation, and more generally development and natural resource management** – not just to meet external MRV requirements.
- Whenever possible, they should **build on existing data collection and monitoring systems** and aim to **strengthen and adapt them**.
- They should be **integrated into the wider national development monitoring systems**, particularly those used to support national planning and budgeting processes and public financial management.

Applications of these principles are illustrated with examples drawn from GCCA experience in Box 1, which focuses on GCCA support for national systems, and Box 2, which focuses on support in specific sectors.

Box 1 – Supporting national climate monitoring systems

In **Cambodia**, the GCCA-supported project notably aims to strengthen the capacity of the National Climate Change Committee to monitor the implementation of the national climate change strategy, policy and plans. The development of a **national monitoring and evaluation framework for climate change** is under way.

In **Chad**, support will be provided to the Ministry of Environment and Fisheries to develop a **monitoring system for the national adaptation programme of action (NAPA)**. This includes the (re)formulation of objectives, the identification of indicators and definition of targets, and the implementation of a data collection and analysis system supporting performance assessment initially at the project level, and later on at the national level. Further data collection and analysis, and the **mainstreaming of climate change into national monitoring systems**, will be supported as part of efforts to mainstream climate change into the national development plan.

(...)

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Box 1 – Supporting national climate monitoring systems (cont'd)

In the **Comoros**, the GCCA will promote the **strengthening of national monitoring, reporting and planning systems with respect to climate change-related activities**, in collaboration with and in support of the Central Planning Office (Commissariat général au plan), the Ministry of Finance, the planning and monitoring divisions of key sector ministries, and the future donor coordination platform.

In **Haiti**, the GCCA intervention will help strengthen the capacity of the Ministry of Environment to support, supervise and validate **strategic environmental assessments (SEAs) and environmental impact assessments (EIAs) that integrate climate change adaptation aspects**. The National Geospatial Information Centre (CNIGS) will be closely associated. It will intervene in data acquisition and processing, and will get assistance to develop applications for sharing data on observed and projected climate change impacts with government services and project promoters. This will help create national capacities for climate-related MRV, including for the development of climate-relevant baselines and scenarios in future EIAs and SEAs.

In **Lesotho**, one of the criteria associated with the disbursement of the second tranche of GCCA budget support is the finalisation of **monitoring and evaluation frameworks for the new climate change adaptation and renewable energy strategies**, providing clear information on sources of information, availability of data and reliable data collection methodologies. The technical assistance component of the GCCA programme will support capacity building for stakeholders – including non-state actors – for the coordination, monitoring and evaluation of key strategies contained in the National Strategic Development Plan (NSDP 2012-2016) from the point of view of climate change.

Box 2 – Supporting sector-specific climate monitoring systems

In **Belize**, a **water management system** will be developed for monitoring the quality and quantity of national water resources in the context of climate change and other pressures on water resources. This activity is linked to the development and implementation of a master plan for integrated water management.

In **Bhutan**, based on the identification of some weaknesses in **monitoring the performance of the renewable natural resources (RNR) policy and strategy**, improvement in sector monitoring and the quality of statistical data has been made a criterion for sector progress and disbursement of the variable tranche of budget support. For the second year of the programme, disbursement criteria notably bear on the successful integration of the monitoring and evaluation arrangements associated with the RNR sector's action plan for climate change adaptation into the national planning and monitoring system; a substantial improvement in the quality of the **national RNR statistical system** is also expected. The Bhutan budget support programme also stands out by the **selection of relatively ambitious outcome indicators/criteria**, measuring in concrete terms the implementation of agricultural practices that reduce vulnerability (development of infrastructure to save, store and reuse rain and groundwater, and introduction of sustainable land management practices) and reduce GHG emissions (methane abatement techniques, livestock-biogas initiatives).

(...)

Box 2 – Supporting sector-specific climate monitoring systems (cont'd)

In **Guyana**, the GCCA supports the implementation of the Mangrove Management Action Plan, which pursues a mix of adaptation and mitigation objectives. In this context, a mangrove inventory of the entire coastline has been prepared; a **mangrove monitoring plan** and **mangrove monitoring protocols** have been produced; and a GIS monitoring system has been developed to manage field data and remote sensing images/aerial photos of the country's coastline. Training in the use of GIS and GPS tools has been provided to project unit staff and mangrove rangers. Monitoring at project field sites notably supports the development of a **comprehensive database on the survival and growth of planted mangroves**. Improved understanding of the physical, biological and social factors that affect the success of mangrove restoration operations will support the definition of an improved site selection process, and generally help increase the sustainability of restoration activities.

In **Jamaica**, as part of efforts to rehabilitate and sustainably manage watersheds, some 110 000 ha of forested crown lands have been assessed, and a geo-referenced database is being developed, providing a foundation for a **national forest monitoring system**. To monitor forests resources in a systematic manner and track changes caused by climate variations, 21 permanent sample plots have been established; data collection and baseline measurements have been completed for all the plots. Also, under the coastal ecosystem restoration and protection component, thirty data loggers for the measurement of sea surface temperature have been procured and installed in four marine protected areas. Data are collected at regular intervals and passed on to the experts in charge of developing a **coastal ecosystem monitoring database**.

In **Maldives**, the multi-donor Climate Change Trust Fund to which the GCCA contributes supports a project for “wetlands conservation and coral reef monitoring for adaptation to climate change” that notably aims to pilot capacity building for **coral reef monitoring** in tourist resorts. Related activities include training delivery, field monitoring, remote sensing monitoring, the use of decision tools for climate change risk assessment, and the development of a web-based platform (“coral reef monitoring framework”) to enable easy access to data and decision support tools.

Developing countries are increasingly encouraged to report on support received (as well as gaps in support). **Being transparent** on how they allocate external as well domestic resources to climate-related priorities **can help attract larger amounts of international support** (e.g. through budget support or national climate change trust funds). A good understanding of climate-related investment and current expenditures also supports objectives in terms of **efficient allocation of resources** and **domestic accountability**. So far however, GCCA experience in relation to the tracking of climate change-related resource allocations within developing countries has been limited. Box 3 provides an overview of this experience.²⁶

²⁶ For further information on the tracking of climate finance and related issues, see the background paper entitled *Making climate finance effective: strengthening national public financial management and budgetary systems*.

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Box 3 – Tracking climate change-related resource allocations

In **Bhutan**, one of the disbursement criteria selected for the second year of the budget support programme relates to the development of a **software programme**, as part of monitoring arrangements for the renewable natural resource sector, **to automatically relate expenditures to planning**. This should notably support the tracking of adaptation- and mitigation-related activities in the agricultural sector.

In **Cambodia**, the GCCA (through the Cambodia Climate Change Alliance project) has supported a **climate change public expenditure and institutional review (CPEIR)**. CPEIRS notably provide an overview of the expenditure on climate change within the national budget and the broader national context. Although they are conducted on a project basis, they can usefully support the development of more permanent systems for tracking climate-related allocations and actual expenditures in the national budget. In Cambodia, the CPEIR notably reveals that the proportion of **public expenditure that is climate-relevant** has grown from 14.9% in 2009 to 16.9% in 2011. Study results have been discussed with members of the Climate Change Technical Team, an inter-ministerial body to play a technical and advisory role to the National Climate Change Committee. They include recommendations to develop national systems and capacities to efficiently manage climate change finance. Follow-up activities have been included in a work plan for the development of a climate change financing framework.

3.2. ADDRESSING THE TECHNICAL AND TECHNOLOGICAL REQUIREMENTS FOR CLIMATE-RELATED MRV

To meet MRV requirements under the Convention while supporting national decision making, climate-related monitoring systems should ideally encompass multiple aspects. In all cases:

- **Data collection systems and procedures** covering physical and environmental, social and economic data must be developed.
- **IT equipment** (hardware and software including database management systems) is needed to support the storage, retrieval and processing of various types of data.

Table 3 lists the elements of a comprehensive climate-related monitoring system and provides examples of the associated data and system requirements, without seeking to be exhaustive.

Table 3 – Possible scope of climate-related monitoring systems and associated requirements

Aspects to monitor	Examples of data requirements	Examples of system requirements
Climate variability and change	<ul style="list-style-type: none"> • Meteorological data supporting the establishment of weather statistics and climate trends • Data resulting from climate change projections 	<ul style="list-style-type: none"> • Weather monitoring stations spread across the territory • Climate models supporting downscaling at appropriate levels
Climate impacts and vulnerabilities, adaptation measures and their impacts	<ul style="list-style-type: none"> • Data on agricultural production, food security, water, state of the environment, ecosystem services, disease patterns, household income, livelihood patterns, etc. • Economic value of damage associated with extreme weather events • Existing coping strategies and their effectiveness • Precise description of adaptation 	<ul style="list-style-type: none"> • Climate change scenarios • Local and national statistical systems tracking key indicators of impact and vulnerability • Sector-specific and macroeconomic models supporting the simulation of the impacts of variations in climate parameters, the assessment of climate-induced economic losses, and the simulation of the impacts of adaptation measures

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Aspects to monitor	Examples of data requirements	Examples of system requirements
	measures, incl. their nature, scope, objectives, expected results and actual achievements, expected and actual co-benefits and negative impacts	<ul style="list-style-type: none"> Analytical frameworks supporting data analysis in the light of climate parameters
GHG emissions by sources and emission removals by sinks, mitigation measures and their impacts	<ul style="list-style-type: none"> Activity data (as categorised in IPCC guidelines), notably in relation to energy generation and use, industrial processes, solvent and other product use, agriculture, LULUCF and waste Emission factors (possibly adjusted for national circumstances) associated with the various activities tracked Land use data Precise description of mitigation measures, incl. their nature, scope, objectives, expected results and actual achievements, expected and actual co-benefits and negative impacts 	<ul style="list-style-type: none"> Local and national statistical systems tracking emission- and absorption-related activities, incl. changes in land use Methodologies for establishing reliable emission factors Sector-specific and macroeconomic models supporting the simulation of the impacts of mitigation measures, and of possible interactions between adaptation and mitigation measures Models supporting the assessment of climate change impacts on emission- and absorption-related activities, emission factors and mitigation measures
Allocation of resources to climate-related priorities	<ul style="list-style-type: none"> Public expenditures in support of climate-related MRV, adaptation and mitigation Private investment in adaptation and mitigation 	<ul style="list-style-type: none"> Budget classification systems supporting the tracking of climate-related expenditures Systems and procedures supporting the “flagging” of climate-related expenditures in non-climate programmes and projects²⁷ National statistical systems supporting the tracking of foreign direct investment (possibly also domestic investment) in adaptation- and mitigation-related projects

It is recognised that this is ambitious for all countries and **prioritisation of actions related to the development of climate-related monitoring systems** should be done by taking into account other priorities and opportunities linked to the strengthening of national development monitoring systems.

Key technical requirements for the development of reliable, credible climate-related MRV systems include, besides access to adequate equipment and software:

- the setting of **clear objectives**;
- the **mastering of sometimes complex methodologies**, such as those being developed to estimate the emissions and emission removals associated with activities in the land use, land use change and forestry (LULUCF) sector²⁸;
- the definition of **sound indicators**;
- good **data collection and processing procedures**;

²⁷ Until such systems and procedures are in place, and to support their establishment, periodic climate change public expenditure reviews or CPEIRs can provide useful information.

²⁸ For more information on this, see the background paper entitled *From forests to sustainable land management: creating synergies between adaptation and mitigation*.

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- good **statistical, analytical and data presentation skills**;
- **quality assurance and control mechanisms**; and
- **transparent and comprehensive reporting procedures**.

Monitoring often involves the acquisition of new technologies, for both capturing and analysing/interpreting data. A key sustainability factor in this regard is the **development of local capacities to operate, as well as maintain, new equipment and information systems**. In some cases, local resources may be insufficient, and provisions should be made to ensure the availability of external technical support on an ongoing basis. Recurrent training sessions may also need to be organised, to take account of staff turnover and/or upgrade the skills of existing staff. Some GCCA interventions have a specific focus on the acquisition of technologies and/or specific technical skills for MRV. Box 4 provides examples of such interventions; further examples are given in Box 10 (Section 3.5) in relation to support for REDD-related MRV.

Box 4 – Acquisition of new technologies and technical skills

The **Bangladesh** Climate Change Resilience Fund to which the GCCA contributes supports the **spatial and temporal downscaling of climate models**, with a view to making climate data more relevant to decision making. Improved climate change scenarios will notably allow modelling the hydrological impacts of climate change on the Ganges-Brahmaputra-Meghna system, to guide the design of new infrastructure such as flood protection embankments.

In **Benin**, the cartography component of the GCCA project supports the acquisition of new **geographical information system (GIS) data** and new **topographic maps** covering the whole territory, as well as the strengthening of capacities of the National Geographical Institute and structures in charge of producing maps. This will contribute to a variety of objectives, including the assessment and monitoring of floods and droughts, better informed land use planning, improved adaptation planning and monitoring, more sustainable forest management, and the assessment of forest carbon stocks. Planned activities include the completion of the national cartographic coverage by high-resolution satellite imagery, the development of a GIS, and the production of thematic maps based on image interpretation.

In **Chad**, support will be provided for the **calculation of the CO₂ emission factor of the power supply network**, as a basis for determining the carbon credit potential of renewable energy projects. This is a pre-requisite for the submission of energy-related projects or programmes of activities to the Executive Board of the Clean Development Mechanism.

In the **Comoros**, the GCCA supports the **updating of cartographic data** through the acquisition and processing of satellite images and aerial photos, the preparation of ortho-photo base maps for specific regions, the creation of a **national GIS database** (to be managed by the Territorial Planning Directorate), and the development of **vulnerability maps**. Improved management and consolidation of climate change-relevant data, and the sharing of such data with a wide range of decision makers, are expected to enhance the mainstreaming of climate change into national and local planning and monitoring processes.

In the **Eastern Caribbean**, the GCCA intervention will help build human and technical capacities to effectively operate and manage a number of technical tools (e.g. cartographic tools, GIS, global positioning system (GPS) tools, computer-assisted design software) required for the **collection, storage, analysis and display of geo-spatial data**. This will support decision making and monitoring in relation to the development and implementation of sustainable land management policies and strategies.

(...)

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Box 4 – Acquisition of new technologies and technical skills (cont'd)

In the **Gambia**, where the setting up of an ICZM process is also under way, the GCCA supports the establishment of an **information management system at the National Environment Agency**, including a GIS, to allow the analysis of historical and new data relevant to ICZM and adaptation.

In **Mauritania**, the GCCA project will support training in the design of climate change scenarios using climate models appropriate for the Mauritanian context, and the **modelling of climate change impacts on agro-pastoral systems** based on the analysis of historical data.

To support capacity for integrating climate change considerations in policies, strategies and plans, the GCCA project in **Myanmar** will provide training and technical assistance for **data management, climate observation, climate modelling and impact modelling**, and related reporting.

In **Senegal**, a key component of the GCCA project is the establishment of an integrated coastal zone management (ICZM) system aimed at coastal protection. Project activities include the collection of data on coastal hydrodynamics for integration in the **database of coastal areas**, and the development of a **GIS-based tool** supporting coastal zone monitoring, planning and early warning.

In **Timor-Leste**, the GCCA project will support the **enhancement of 19 existing weather monitoring stations** across all districts to improve national capacity to monitor and map climate events. It will also help improve the capacity of ALGIS (the **Agriculture and Land Use Geographical Information System**) to collect and monitor climate data from all districts, analyse them through agro-ecological perspectives, and disseminate their interpretation at both local and national level. Training will be provided in mapping, data interpretation and land use management.

In **Vanuatu**, support to **early warning and monitoring systems** will allow building the ability of farmers to cope with critical situations, such as flooding. **Hazard and risk mapping** will also be conducted to demarcate high-risk areas and specifically help coastal communities to avoid expansion of settlements into flood-prone areas.

3.3. PROMOTING INSTITUTIONAL AND CAPACITY STRENGTHENING IN SUPPORT OF MRV

Technical performance in the development and operation of MRV systems cannot be achieved in the absence of a supportive institutional framework. **Key institutional requirements** include:

- an **enabling environment for accessing and developing a wide range of capacities** (linked to the technical requirements listed in Section 3.2 above), including for applied research (see Section 3.3.1);
- the setting up of structures and procedures in support of the **management, sharing and dissemination of MRV-related knowledge** (see Section 3.3.2);
- supportive institutional arrangements, notably with respect to **inter-institutional and cross-sectoral cooperation and coordination** on climate-related monitoring and reporting issues (see Section 3.3.3);
- the **involvement of non-state actors**, where this adds value (e.g. through enhanced transparency) (see Section 3.3.4).

High-level political commitment is also needed, including political willingness to accept external scrutiny of the reported data and the way in which they were produced.

Strengthening institutions and enhancing cooperation at the regional level complements institutional development efforts undertaken at the national level. This aspect is addressed in Section 3.4.

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3.3.1. SUPPORTING AN ENABLING ENVIRONMENT FOR THE DEVELOPMENT OF CAPACITIES FOR MRV

Supporting an enabling environment for developing MRV-related capacities may involve, for example, the development of specific training programmes or the inclusion of MRV methodologies in university curricula, support to universities and research centres, and on-the-job learning for undertaking risk and vulnerability assessment (as a way of establishing baseline data and scenarios). As shown in Box 5, GCCA experience in this regard may be related to national or regional capacity building programmes, as in the case of **Bangladesh**, the **DR Congo**, the **Caribbean, Eastern and Southern Africa** and the **Lower Mekong Basin**, or focus on project-related monitoring and reporting activities as a step towards developing larger-scale MRV systems, as in **Haiti, São Tomé and Príncipe** and **Tanzania**.

Box 5 – Supporting an enabling environment for the development of capacities

In **Bangladesh**, in the context of the GCCA-supported Climate Change Strategy and Action Plan, an **International Centre for Adaptation, Research and Knowledge Management on Climate Change** will be established to ensure that the country has access to the latest information, know-how and technologies from around the world. This, combined with research activities undertaken at the national level, should notably support the establishment of strong adaptation-related monitoring systems.

In the **DR Congo**, the **University of Kisangani** is being strengthened in its role of **training centre and centre of competence** in charge of supporting the generational transition within the forest and environment administration. Training programmes will be developed to support participation in forest- and land use-related adaptation and mitigation initiatives; various aspects will be addressed, including carbon stock measurement and monitoring.

In the **Caribbean**, improved **vulnerability and risk assessment techniques and methodologies** are developed and people are trained in their application, following which about ten vulnerability and risk assessments are planned to inform future land use planning, zoning and development planning. A number of risk and hazard assessments will also be carried out, and topographic maps indicating risk areas and levels will be produced.

In **Eastern and Southern Africa**, capacity building activities for **vulnerability assessment** are planned at the Southern African Development Community (SADC) Secretariat and Member State levels, and vulnerability assessment studies will be conducted in at least eight countries.

In the **Lower Mekong Basin**, the GCCA-supported Climate Change and Adaptation Initiative promotes the development of **methods and tools for projecting climate change, for risk and vulnerability assessment** (biophysical and socioeconomic impacts, vulnerability of communities, ecosystems, economic activity and infrastructure) **and for the assessment and prioritisation of adaptation options**. Climate change vulnerability assessments at the basin scale are under way or in preparation in relation to issues such as wetland ecosystems and biodiversity, food security in flood- and drought-prone areas, and drought risks.

In **Haiti**, a data collection and analysis system encompassing environmental sustainability and climate adaptation dimensions will be developed in relation to the implementation of three GCCA-supported local adaptation projects, with the involvement of the Ministry of Environment, the National Geospatial Information Centre (CNIGS) and the Statistical Office. This is meant to constitute a first step in the development of a nation-wide, permanent monitoring system addressing **environmental sustainability and climate adaptation aspects in local development**. This system will notably provide inputs into the work of the soon-to-be established National Environment and Vulnerability Observatory.

(...)

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Box 5 – Supporting an enabling environment for the development of capacities (cont'd)

In **São Tomé and Príncipe**, the GCCA intervention will support the design of an integrated system for **planning and monitoring of adaptation-related activities**, starting with those **implemented in the context of the NAPA and the GCCA-funded local adaptation projects**, to promote knowledge management, ongoing learning and capacity building for adaptation. **Vulnerability and adaptation indicators** will be developed at the national and, as relevant, the local level.

In **Tanzania**, results monitoring and reporting are an integral part of the ongoing **eco-village projects**. In the second phase of the GCCA programme, due to start in early 2014, monitoring arrangements will get even more attention than is currently the case. As in the first phase, proposed eco-village projects will have to be designed on the basis of community-based vulnerability assessments. In addition, successful projects will be requested to conduct **baseline assessments** aimed at facilitating the measurement of progress in achieving results and objectives.

3.3.2. MANAGING, SHARING AND DISSEMINATING KNOWLEDGE IN SUPPORT OF MRV

Activities and frameworks set up with GCCA support to promote knowledge management typically focus on the dissemination of adaptation and mitigation good practices, without a specific focus on MRV. However, some of them have characteristics that can foster the development of an enabling environment for the setting up of improved monitoring and reporting systems, as illustrated in Box 6.

Box 6 – Managing, sharing and disseminating knowledge

In **Burkina Faso**, the GCCA project will support the establishment of a **National Observatory on Environment and Sustainable Development**, which will notably be in charge of developing national climate change-related indicators. It will help create a **database of ongoing studies and research projects on climate change** in the country and Western Africa, and disseminate their most relevant findings. It will also support the **interconnection of various existing information systems**, such as early warning systems linked to food security and natural disasters. This should help create a supportive environment for the monitoring and reporting of adaptation and mitigation activities.

In **Cambodia**, the GCCA project supports the establishment of a **multi-stakeholder climate change information sharing and knowledge management platform**. A new Climate Change Department website launched in November 2012 provides user-friendly and flexible functions to update climate change information and inform the public about the activities of the National Climate Change Committee and Cambodia Climate Change Alliance trust fund, and serves as an on-line knowledge and information platform that allows all key stakeholders to generate and share climate change information. A climate change communication platform involving various line ministries and civil society organisations has also been established.

In **Jamaica**, the institutional and capacity building component of the GCCA intervention supports the establishment of a **national data-sharing mechanism for climate change adaptation and disaster risk reduction**. In this context, GIS software has been purchased, and a spatial database and data sharing mechanism has been developed. Geo-referenced information on climate risks is now available to development planners, the agricultural sector, legal firms and insurance companies, the tourism sector, engineering and construction companies, and development agencies.

(...)

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Box 6 – Managing, sharing and disseminating knowledge (cont'd)

In **Nepal**, the GCCA project has supported the development of **monitoring and evaluation systems for 70 local adaptation plans of action** to be implemented in the Karnali and Rapti river basins, as well as the development of climate change-relevant baselines for the 14 districts concerned. This will provide a strong basis for assessing the effectiveness of adaptation measures. A **mechanism for sharing and learning from adaptation interventions** among different stakeholders **at the district and national levels** will be established.

The GCCA regional project for the **Pacific** supports the development of a **Climate Change Knowledge Centre at the University of the South Pacific**, to become a regional repository for data, reports and scientific documents on climate science, climate change impacts, lessons learned from community adaptation projects, traditional knowledge, and good climate change adaptation practices. This will notably support research and knowledge management for adaptation monitoring. Implementation is under way: hardware and software have been purchased, and several datasets (covering climate and oceanographic observations and model-generated outputs) have been collected for uploading on the project's server.

The setting up of **national and regional networks of pilot and demonstration projects** would be very useful to support knowledge management and the dissemination of good practices, notably with regard to MRV. It is being envisaged in some countries and regions, and networking initiatives have already taken place. For example, representatives of the three ongoing eco-village projects of **Tanzania** have been brought together for a “workshop on lessons learned”, and in the **Lower Mekong Basin** project, exchange visits have been organised between demonstration projects across the various participating countries. A more systematic approach to networking would require networking activities to be included in project formulation documents and work plans, with adequate provisions for financial and/or technical support.

3.3.3. SUPPORTING INTER-INSTITUTIONAL AND CROSS-SECTORAL COOPERATION

In the field of MRV as in other areas, inter-institutional and cross-sectoral cooperation and coordination are key success factors for the development of robust systems and the effective use of the information they generate. Box 7 illustrates how the GCCA supports this type of cooperation in the field of climate monitoring.

Box 7 – Supporting inter-institutional and cross-sectoral cooperation

In the **Comoros**, the updating of cartographic data and the development of a national GIS in support of climate change integration in planning and monitoring processes will build on the know-how of and foster **cooperation between units involved in geographical data processing in various ministries and directorates**, including those in charge of land use planning, infrastructure, environment and civil protection, as well as in the Central Planning Office and the University of the Comoros.

In the **Gambia**, the establishment of an integrated coastal zone management (ICZM) process is supported by the setting up of **two technical working groups of key coastal actors**, one on ICZM and one on climate change, to facilitate multi-sector dialogue and the **joint monitoring** of the implementation of activities.

(...)

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Box 7 – Supporting inter-institutional and cross-sectoral cooperation (cont'd)

In **Haiti**, the implementation and follow-up of a number of strategic environmental assessments and environmental impact assessments will be used as an opportunity to **develop inter-institutional consultation and cooperation** (notably **between the Ministry of Environment and other key sector ministries**) on environmental and climate-related issues, with the potential to create a foundation for further institutional arrangements for climate change mainstreaming. Various government services will also be invited to cooperate in the development of an environment- and climate-related monitoring system for local development activities (see Box 5).

In **Mauritania**, the GCCA project will support the setting up of a national **network of climate change specialists** originating from the **National Meteorological Office**, the **Ministry of Environment and Sustainable Development (MDEDD)** and the **Ministry of Rural Development (MDR)**. These specialists will work together to improve the collection and analysis of climate-related data and make them usable for development-related decision making.

3.3.4. INVOLVING NON-STATE ACTORS

In some GCCA projects, civil society and private sector involvement in monitoring is encouraged, as described in Box 8. This can both enhance the capacity to collect relevant data, and foster transparency.

Box 8 – Encouraging civil society and private sector involvement in monitoring

In the **Central African Republic**, a programme for **strengthening civil society capacities** in the field of sustainable **forest resource management and monitoring** will be developed, and support will be provided for civil society networking on FLEGT ^(*) and REDD+ issues to strengthen its role as an independent observer.

^(*) The EU Forest Law Enforcement, Governance and Trade initiative, which fights trade in illegal timber.

In **Lesotho**, performance monitoring for the GCCA budget support programme is to be undertaken on the basis of the monitoring and evaluation framework of the National Strategic Development Plan (NSDP). Participants in the review of the budget support programme, in addition to the government and the budget support donor group, are to include **non-state actors, members of parliament, civil society representatives**, the **Lesotho Council of NGOs**, and representatives from the **private sector**.

In **Maldives**, the **coral reef monitoring** project financed by the Climate Change Trust Fund involves the participation of at least five tourist resorts, with the objective of demonstrating how monitoring information can be used to support the prioritisation of areas for conservation for the benefit of (among others) the tourist industry. After training, **tourist resort staff** will be directly involved in field monitoring activities and the entry of data into the coral reef monitoring framework; they will also be involved in data analysis and decision making. This is an interesting example of **public-private partnership in natural resource monitoring** in the context of climate change.

3.4. CREATING ECONOMIES OF SCALE AND SYNERGIES AT REGIONAL LEVEL

In addition to supporting national programmes, the GCCA gives support to regional programmes that deliver benefits derived from shared facilities and regional lesson learning. Climate change, being a global issue, requires global information that does not respect national boundaries, the collection and management of which can be particularly burdensome for small countries. GCCA support to the setting up of regional climate monitoring systems is described in Box 9.

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Box 9 – Supporting regional climate monitoring systems

The GCCA-supported **ClimDev Africa** programme supports the upgrading of **climate observation networks and infrastructure** to enhance the provision of essential data for climate services and early warning systems, including seasonal and long-term forecasting at continental and sub-regional levels and downscaling of climate projections and scenarios. The enhanced climate data and information systems are then used to support the analysis of climate change adaptation and mitigation options in a variety of sectors including water, agriculture, energy and health.

In the **Caribbean**, the existing **regional climate monitoring system** is being expanded and integrated into the Global Climate Observing Systems. Over 100 hydro-meteorological stations, and six coral reef early warning stations, are to be installed. A system for the collection, digitizing and storage of data is being set up at the Caribbean Community Climate Change Centre (CCCCC), and a protocol is being developed for **sharing climate monitoring data** collected across the whole region through the CCCCC's information clearing house facility. In view of enhancing the predictive powers of the climate models currently in use, the programme also supports the development of **improved climate models based on data at smaller resolutions** and their subsequent use in studies on climate impacts, with a view to improving adaptation and development planning.

In the **Lower Mekong Basin**, a concept and a work plan have been agreed for a **basin-wide system for monitoring and reporting on climate change and the status of climate change adaptation**. Initial steps towards its implementation are under way, with a focus on data collection, building a framework for data collection and display, and defining a methodology for setting a baseline and detecting changes. This work is linked to the development of a **regional database of climate-related data**, including climate change projections and related flow regime projections. It supports efforts to build the capacities of Lower Mekong Basin governments, institutions and communities to develop climate change-related policies, to plan for and implement climate change adaptation using appropriate tools, and to monitor and report on progress and performance with regard to climate change adaptation.

In the **South Pacific**, the GCCA is supporting the creation of a **Pacific portal on climate change** hosted by the Secretariat of the Pacific Regional Environment Programme, allowing Pacific countries to share experience, good practices, projects outcomes and evaluations and success stories, in the field of both adaptation and mitigation. This complements the setting up of a regional **Climate Change Knowledge Centre at the University of the South Pacific** (see Box 6), which is more scientifically focused.

In **Western Africa**, **hydro-climatologic data management systems** are upgraded through support for the Agrhymet Regional Centre (CRA). The CRA's existing database is being updated, and the production and dissemination of data is improved and extended. This is complemented with activities to strengthen the CRA's capacities to conduct detailed analysis of climate change in the Sahel (and other supported countries), and also to assess the potential impacts of climate change on agro-sylvo-pastoral production systems, on socio-economic systems and on ecosystems. This provides a suitable enabling framework for climate-related knowledge management at the regional level, including on monitoring aspects – especially as the project strives to establish partnerships with NGOs, research institutions and other organisations involved in conducting climate-related studies and assessments.

3.5. SUPPORTING MITIGATION-RELATED MONITORING AND REPORTING: EXPERIENCES WITH REDD+

As shown in Table 2, fewer GCCA projects support mitigation- than adaptation-related monitoring. In some cases, GCCA projects support the development of climate monitoring systems that combine adaptation and mitigation dimensions; this is the case, for example, in **Bhutan**, **Burkina Faso**,

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Guyana and **Lesotho**. In the **ClimDev Africa** programme and in **Benin**, the primary focus is on adaptation but limited mitigation-related aspects are addressed.

Otherwise, in the field of mitigation, the bulk of GCCA support for climate-related monitoring and reporting systems is focused on REDD+, which is characterised by quite demanding MRV requirements. The first stage of the “REDD+ readiness” process involves getting a clear understanding of the drivers of deforestation and forest degradation, defining country-specific forest reference levels, undertaking forest inventories, defining emission factors associated with forest-related activities, and setting up forest monitoring systems. In this specific case too, the development of national capacities and the setting up of suitable technical support and maintenance arrangements are key to sustainability, as experience with the operation of **Mali**'s forest information system has shown. Box 10 provides an overview of how the GCCA supports the setting up of MRV systems in preparation for REDD+.

Box 10 – Supporting REDD-related MRV

In the **Caribbean**, a seminar will be organised to enhance capacities to develop **reference scenarios** for REDD+ and to comply with **MRV requirements**.

In the **Central African Republic**, the GCCA project will support the development of a **regional environmental management and monitoring system** for the Southwest region, in connection with the definition and implementation of a regional REDD+ strategy and the registration of a regional REDD+ pilot project. This includes the development of a GIS-based land use plan covering the Southwest region's whole territory, the development of a baseline deforestation scenario, the *ex ante* assessment of the carbon storage potential, and the setting up of a regional MRV system aligned with the national system. The project will also finance the realisation of an **environmental and social strategic assessment for the regional REDD+ strategy**; this will help determine, optimise and monitor the impacts of REDD+ implementation.

In the **DR Congo**, capacity building activities will notably bear on **carbon stock measurement and monitoring** in support of the ongoing REDD+ readiness process.

In **Mali**, the GCCA supports improved knowledge and monitoring of forest stocks, in preparation for more sustainable forest management and for participation in REDD+ or other funding opportunities linked to carbon sequestration. The project capitalises on previous **forest inventories**, while supporting the implementation of additional forest inventories and of **studies on the carbon sequestration potential** of various tree species. Capacity building support is also provided to the SIFOR (forest information system) management unit to enable it to produce reliable information on the evolution of forest stocks; SIFOR and other staff of the National Directorate for Water and Forests have notably received training in the use of a GIS, including GPS-assisted geo-referencing. Experience has shown that **the setting up of a sustainable national forest information system requires**, beyond its development and installation, **the continued provision of adequate technical support and maintenance services**.

In **Papua New Guinea**, the GCCA provides support to the PNG Forest Authority for the implementation of a **continuous and multi-purpose national forest inventory**, to be part of the national forest monitoring system that will be set up in the context of country's participation in REDD+. The forest inventory will provide the foundation for the REDD+ MRV mechanism, and a baseline for the five pilot REDD+ projects currently under preparation. Methodologies will combine field data collection with the use of a satellite land monitoring system. Once a methodology has been developed and the necessary systems are in place, inventory operations will be conducted on the basis of semi-annual data collection work plans. To share the available data, an **on-line forest inventory database** will be developed.

(...)

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Box 10 – Supporting REDD-related MRV (cont'd)

In **Sierra Leone**, a significant amount of preparatory work needs to be done by the country before qualifying for REDD+. The GCCA will support the completion of the **forest and carbon inventory**, the development of a **MRV system**, and the understanding of the dynamics behind deforestation. The project will also strengthen the Forestry Division of the Ministry of Agriculture, Forestry and Food Security to prepare the country for REDD+ MRV mechanisms.

4. CONCLUSIONS AND QUESTIONS FOR DISCUSSION

Strengthening institutions, capacities and systems for climate-related MRV supports developing countries' ability to identify and implement effective and efficient adaptation and mitigation measures, prioritise the allocation of resources, serve domestic accountability objectives, and build the confidence needed to attract scaled up amounts of climate finance from developed countries. However, the multiplication of reporting and review requirements, and rising expectations with respect to the reliability and complexity of climate-related MRV systems, are a potential source of concern for developing countries with limited capacities and resources. Economies of scale can be achieved if monitoring and reporting systems are conceived in such a way that they serve multiple purposes, both in relation to climate change-related activities and in support of development objectives and priorities, and if regional initiatives are put in place and supported. The integration of climate monitoring systems into wider national development monitoring systems, and/or the mainstreaming of climate-related aspects directly into existing monitoring systems, support efficiency and sustainability.

The majority of GCCA interventions contribute to the setting up or strengthening of climate-related monitoring systems – although this is achieved in very different ways. In some countries or regions, strengthening these systems is a specific objective or a key component of the intervention; in some others, it is a relatively marginal activity that contributes to other objectives. There is evidence that some projects build on existing data and systems and/or promote the integration of climate-related monitoring systems into existing development monitoring systems, but these aspects are not systematically emphasised, and may not be relevant to all contexts.

Recently designed interventions place a strong emphasis on arrangements to support the identification and dissemination of good practices, the sharing of experience, and the creation of a supportive framework for the replication of successful practices. Monitoring the effectiveness of adaptation measures is particularly challenging, and an in-depth study of the monitoring and evaluation arrangements set up for GCCA-funded pilot adaptation projects would be useful to identify challenges and good practices in this regard.

Based on these considerations, and in view of GCCA experience as summarised in this paper, the following questions are proposed for discussion at the Global Policy Event:

- 1. Can you share a specific experience or practice from your country with the monitoring, reporting and verification (MRV) of mitigation, REDD+, adaptation or finance? To what extent are the MRV requirements and recommendations under the UNFCCC and the needs of developing countries for national development monitoring aligned?** (e.g. building on existing data management systems; integration into existing development monitoring systems) What are the challenges? How is the country addressing them? What have been the results to date?
- 2. Based on the experience and practice in your country with respect to MRV and development monitoring, what recommendation(s) would you make to climate change negotiators and the**

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international development community to make monitoring, reporting and verification more effective? Can you make the case for your recommendation(s) using the experience and practice in your country?

5. BIBLIOGRAPHY

This paper was drafted using information, official documents, reports and other working documents published on the UNFCCC website (<http://unfccc.int>), as well as the following publications:

Bird N., Tilley H., Canales Trujillo N., Tumushabe G., Welham B. & Yanda P. (2013) *Measuring the effectiveness of public climate finance delivery at the national level*. Overseas Development Institute, London. Available from:

<http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8303.pdf>

Fransen T. (2009) *Enhancing Today's MRV Framework to Meet Tomorrow's Needs: The Role of National Communications and Inventories*. World Resources Institute, Washington, DC. Available from: http://pdf.wri.org/working_papers/national_communications_mrv.pdf

GIZ (2012) *Adaptation made to measure: A guidebook to the design and results-based monitoring of climate change adaptation projects*. Gesellschaft für Internationale Zusammenarbeit / BMZ (Federal Ministry for Economic Cooperation and Development of Germany). Available from:

<http://www.ccarai.org/files/giz2012-0243en-climate-change-monitoring.pdf>

GIZ (2011) *MRV and the International Climate Change Negotiations: Coming to Terms with MRV*. Factsheet. Gesellschaft für Internationale Zusammenarbeit. Available from:

<http://star-www.giz.de/fetch/1ibSQ0b01XfHK000g0/giz2012-0022en-international-climate-change-negotiations.pdf>

OECD-DAC (2011) *Handbook on the OECD-DAC Climate Markers*. Organisation for Economic Co-operation and Development, Paris. Available from:

<http://www.oecd.org/dataoecd/56/18/48785310.pdf>

OECD (2009) *Integrating Climate Change Adaptation into Development Co-operation: Policy guidance*. OECD Publishing, Paris. [Read-only, browse-it edition] Available from:

<http://browse.oecdbookshop.org/oecd/pdfs/browseit/4309171E.PDF>.

UNDP-UNEP (2011) *Mainstreaming Adaptation to Climate Change into Development Planning: A Guide for Practitioners*. UNDP-UNEP Poverty-Environment Initiative. Available from:

<http://www.unpei.org/knowledge-resources/publications.html>.