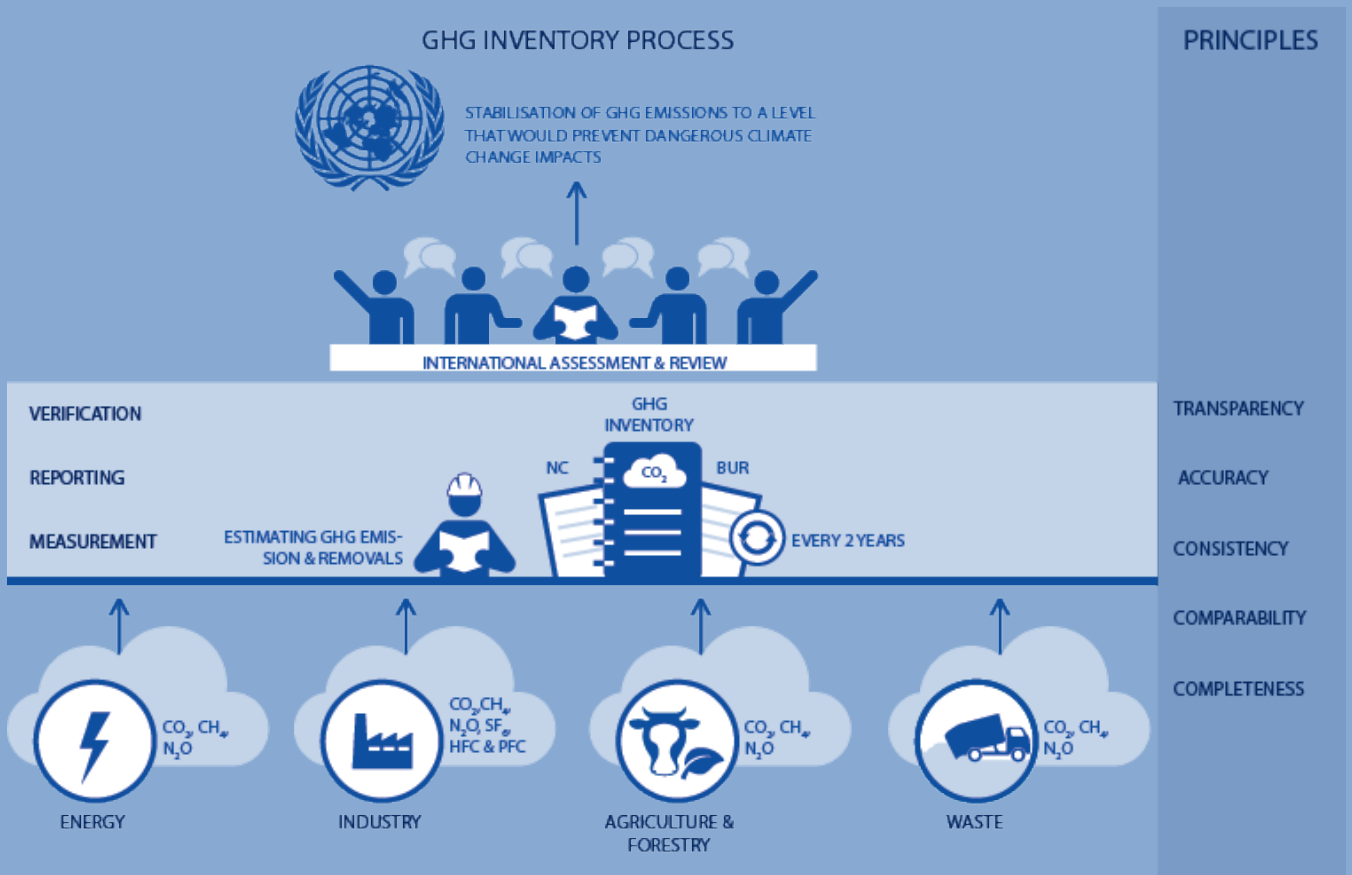
GUIDELINES FOR DESIGNING

CAPACITY BUILDING PROJECTS ON CLIMATE MRV

Input to NDC, BUR and mitigation actions in developing countries



This knowledge product is the result of the project "Capacity building on monitoring, reporting, and verification of GHG emissions and actions in developing countries" (also known as 'MRV Africa' project), funded by the European Commission, DG Climate Action. The aim of this document is to share the views and lessons learnt from the project with entities or professionals interested in designing a capacity building project for developing countries. The building blocks provided here are to be used in addition to the relevant UNFCCC and IPCC Guidelines. The knowledge product has been prepared by NIRAS with support from GreenStream Network, Camco Services and Tüv Rheinland.

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Table of Content

1. Introduction 1

1.1 UNFCCC reporting 1

2. Measurement, Reporting, and Verification (MRV) 3

2.1 What is MRV? 3

2.2 Why is MRV needed? 3

2.3 Key Elements of an MRV System 4

Official Set-up 4

Institutional Set-up 4

Procedural Set-up 5

3. Capacity building for MRV 6

3.1 Needs-Based: Tailored Capacity Building Plan 6

Availability of Systems and Staff 7

Assessment tools 7

Establish a Capacity Building Plan 8

3.2 Inclusive: Capacity building of governmental institutions and private sector 11

3.3 Sustainable: Integrated Institutional set-up to ensure a sustainable system 12

3.4 Practical: Pilot implementation in selected sub-sectors that can be replicated in other sectors 15

3.5 Experience sharing: wider dissemination and knowledge transfer 17

Experience sharing 17

Knowledge transfer 17

3.6 Beneficial: Create benefits for all relevant stakeholders and sectors 18

4. Conclusions and Recommendations 20

Abbreviations

BUR	Biennial Update Report
CDM	Clean Development Mechanism
COP	Conference of the Parties
CAMPAS	Central Agency for Public Mobilisation and Statistics (Egypt)
GHG	Greenhouse gases
EFDB	Emission factor database
EU	European Union
FME/DCC	Federal Ministry of Environment/Department of Climate Change (Nigeria)
ICA	International Consultation and Analysis
IPCC	Intergovernmental Panel on Climate Change
LECB	Low Emission Capacity Building
LEDS	Low Emission Development Strategy
MRV	Measurement, Reporting, and Verification
NAMA	Nationally Appropriate Mitigation Actions
NDC	Nationally Determined Contribution
NC	National Communications
QA	Quality Assurance
QC	Quality Control
REDD+	Reducing emissions from deforestation and forest degradation-plus
UNFCCC	United Nations Framework Convention on Climate Change

1. INTRODUCTION

1.1 UNFCCC REPORTING

The Paris Agreement adopted in 2015 in Paris elevated institutional training and capacity building on monitoring, reporting and verification of greenhouse gases to new heights as important avenues toward climate action. The agreement aims to foster an opportunity to increase the enhanced, strategic and sustained approaches supporting transformational change and enabling all Parties and stakeholders to build the capacities needed to mitigate and adapt to climate change. A key principle of the Paris Agreement is the participation of all. Measurement, reporting, and verification (MRV) is given a central place under the Paris Agreement, thus enhancing the requirements existing already under the UNFCCC Convention.

The United Nations Framework Convention on Climate Change (hereafter called the Convention) laid the foundation for the current system of reporting climate information. [1] Article 12, paragraph 4 of the Convention mandates all Parties to communicate actions they have taken or envisage to take to implement the Convention to the Conference of the Parties (COP), through the Secretariat. This includes information on greenhouse gas (GHG) emissions by sources, removals by sinks, as well as on the actions that Parties are taking to mitigate and adapt to climate change. [2]

The arrangements for national reporting under the Convention have since evolved over the subsequent COP meetings. The Kyoto Protocol, which implements the framework Convection, helped to put in place a comprehensive MRV framework which remains up to now the most detailed and comprehensive set of rules and also the reflection of best practices regarding MRV and setting up national systems under the Convention. The set of rules for reporting information under the Convention were further detailed to include guidance on the content and frequency of National Communications (NC), provisions for Biennial Update Reports (BUR) and Biennial Reports along with the process of international consultation and analysis (ICA) and respectively International Assessment of these reports. [3]

For developing country Parties, the current MRV framework under the Convention includes submitting NCs every four years and BURs every two years, undergoing ICA, and setting up domestic MRV. Moreover, it includes undertaking MRV of the Reducing Emissions from Deforestation and Forest Degradation (REDD+) activities for the purpose of obtaining and receiving results-based incentives.

The international requirements for reporting were further updated at COP 21 in Paris which adopted a comprehensive MRV framework applicable to all. According to Article 13, paragraph 7 of the Paris Agreement, *each party shall regularly provide a national inventory report of anthropogenic emissions by sources and removals by sinks of GHGs, as well as information necessary to track progress made in implementing and achieving its nationally determined contributions (NDC)*. Paragraph 91 of the decision text adopting the Paris Agreement clarified that developing countries *shall submit national GHG inventory information no less frequently than on a biennial basis*. [4] The GHG inventory submitted by each Party are to undergo a technical expert review. [5] NDCs are to be submitted every five years to the UNFCCC. [6] Parties are expected to submit the next round of NDCs by 2020 and every five years thereafter. [7] In 2018, a facilitative dialogue among Parties will convene to take stock of the collective efforts of all Parties in relation to progress made

[1] https://unfccc.int/files/national_reports/annex_i_natcom_/application/pdf/non-annex_i_mrv_handbook.pdf
[2] UNFCCC. Art. 12.5 and 4. 3.
[3] Cancun Agreements. Art. 42-46 and 60.
[4] Decision 1/CP21, para 91
[5] Paris Agreement, Art 13, para 11
[6] Decision 1/CP21, para 23 and 24
[7] Decision 1/CP21,para 23 and 24

towards the long-term goal and to inform the preparation of the NDCs (known as global stocktake).[8]

The Paris Agreement makes it clear that all developing countries must be provided with support in order to be able to put in place the institutional structures needed to support compliance with the new transparency obligations for which reporting guidelines are to be adopted at COP 24.

According to the Paris Agreement capacity-building should be "*guided by lessons learnt, including those from capacity-building activities under the Convention, and should be an effective, iterative process that is participatory, cross-cutting and gender-responsive*".[9] Against this background, the purpose of this guidance document is to share lessons learnt and experience obtained during the capacity building work conducted under the Europe Commission-funded project "Capacity building on monitoring, reporting, and verification of GHG emissions and actions in developing countries".

[8] Paris Agreement Art 14 and Decision 1/CP21, para 20

[9] Paris Agreement, Art 11, para 2

2. MEASUREMENT, REPORTING, AND VERIFICATION (MRV)

2.1 WHAT IS MRV?

Effective climate change mitigation is closely related to understanding GHG emissions and their sources, as well as the impacts of any mitigation strategy. In this context, the concept of MRV serves as a fundamental practice to describe all measures taken by countries to collect data on GHG emissions, mitigation actions, and support. MRV incorporates three independent but interconnected processes of measurement, reporting, and verification. The practice of MRV comprises the following steps:[10]

Measurement (M) applies to data and information related to greenhouse gas emissions, mitigation actions, and support. Measurement is carried out at the national level and can include direct physical measurement using devices or estimation using simple methods or complex models. For example, the Intergovernmental Panel on Climate Change (IPCC) Guidelines are used to measure (estimate) GHG emissions and removals by sinks. When monitored, the changes in GHG emissions can be assessed for their sustainable development impacts and against the targets communicated in the NDC. The measurement also includes collecting information about the emission reductions achieved by implementing mitigation actions in a country. Moreover, measurement also includes quantification of support a country has received for implementation of mitigation or adaptation actions as well as the support required to implement its climate related actions.

Reporting (R) is the compilation and documentation of the collected information and its communication through national reports to the UNFCCC. This includes the GHG inventory, adaptation, and mitigation actions and their effects, constraints and gaps encountered, support needed and received, and any other relevant information. The reporting can be done through NCs, BURs, or GHG inventory reports following a set of guidelines. The guidelines provide a roadmap to facilitate and standardise the reporting process. For NCs, they can be found in the annex to decision 17/CP.8, while for BURs they are contained in decision 2/CP.17, annex III.

Verification (V) refers to reviewing the reported information in order to check its quality. Verification ensures that the reported information is in compliance with established guidelines. It assesses the completeness and the reliability of the reported information and gives room for future improvement. Verification can be carried out at the national level, using domestic MRV mechanisms. It is also carried out internationally through the ICA process with the objective of increasing the transparency of mitigation actions and their effects, as well as the support needed and received.

2.2 WHY IS MRV NEEDED?

MRV is a system that has been used by governments and other entities in the form of monitoring and evaluation even before it appeared under the Convention. It helps to assess and track the implementation of planned actions and when applied at the national level, it assists with clearly assessing the status of implementation and progress achieved of national climate change goals. It also serves to better understand the key sources and sinks of GHG emissions, overall emissions trends, the effectiveness and impacts of mitigation strategies, and the necessary support for continuous improvement. MRV systems serve countries' domestic goals and priorities and is a tool for good governance.

Internationally, MRV enables countries to meet their reporting requirements under the Convention. Taking into account the enhanced transparency framework of the Paris Agreement for post-2020 requirements, countries are ex-

[10] UNFCCC, 2014 "Handbook on MEASUREMENT, REPORTING AND VERIFICATION FOR DEVELOPING COUNTRY PARTIES"

pected to report on their national GHG inventory and progress towards achieving their NDCs. Accordingly, MRV will help countries in the following:

- Build national capacities and ensure sustainability of reporting processes
- Provide the information basis for planning and implementing mitigation actions
- Unlock new sources of finance to combat climate change by documenting impact and good governance practices
- Inform national and international policymakers
- Identify needs for technical and financial support and assist in institutionalising activities related to reporting on climate change

Figure 1: Why is MRV needed?

Problems with no system	Benefits of an MRV system
Missing and incorrect data	Retrieve historical data
Inventory inaccuracy	Obtain data on time
Manual paper processes	Standardised and automated process
Insufficient reporting	Report on time
Wastes time and effort	**Report with least effort**

Figure developed by NIRAS.

2.3 KEY ELEMENTS OF AN MRV SYSTEM

An MRV system comprises three main elements: official, institutional, and procedural. Each of these elements is described in the below sub-sections.

OFFICIAL SET-UP

To implement an MRV system effectively, relevant stakeholders involved in the MRV activities have to be directly engaged. Therefore, a formal instrument must be established to define roles and responsibilities, flow of information and data collection, frequency of reporting, and reporting modalities among different stakeholders. The official set-up can be either legally binding in the form of a Law, Act by Parliament, or an Executive Decree (presidential or cabinet level). It can also be a non-legally binding agreement in the form of a Memorandum of Understanding setting out the intended reporting modalities. Every official set-up instrument has its strengths and weaknesses. However, the selected instrument has to be suitable to the country's circumstances. The official set-up mainly serves to formalise the engagement of stakeholders, usually between the coordinating entity of the MRV system and other government and non-government institutions.

INSTITUTIONAL SET-UP

To implement an effective MRV system, it is essential to develop a robust institutional framework that encompasses the relevant entities as well as the necessary staff, systems, and processes. The institutional MRV set-up of a country reflects the specific drivers such as meeting the country's commitment to the Convention. Therefore, the institutional set-up is the country's vehicle to implement MRV activities including tracking GHG emissions, implementing mitigation actions, and cataloguing support needed and received.

Countries have taken various approaches to designing institutional arrangements for MRV that also reflect their national circumstances, capabilities, and capacities of the entities involved. Therefore, there is no single way of setting up an institutional framework. However, the common element found in most countries' MRV institutional arrangements is a coordinating entity that takes the leading role. Usually the ministry of environment, or equivalent, coordinates the MRV system and directs the activities of other entities[11]. Other good practice examples include establishing an inter-ministerial body or steering committee to promote coordination across key stakeholders, forming sectoral working groups to carry out specific MRV activities within their sectors, as well as appointing technical coordinators to be responsible for the outputs of the MRV system in each specific sector. [12] The first step in defining an institutional set-up is to map out all key stakeholders and their respective roles and responsibilities.

PROCEDURAL SET-UP

The procedural set-up refers to the predefined, standardised templates and procedures for data collection, reporting, and monitoring. Examples include standardised data collection templates, automated emission estimation spreadsheets, as well as quality assurance and quality control plans.

The key elements of an MRV system set-up are exhibited in Figure 2 below.

Figure 2: Key Elements of MRV System Set-up

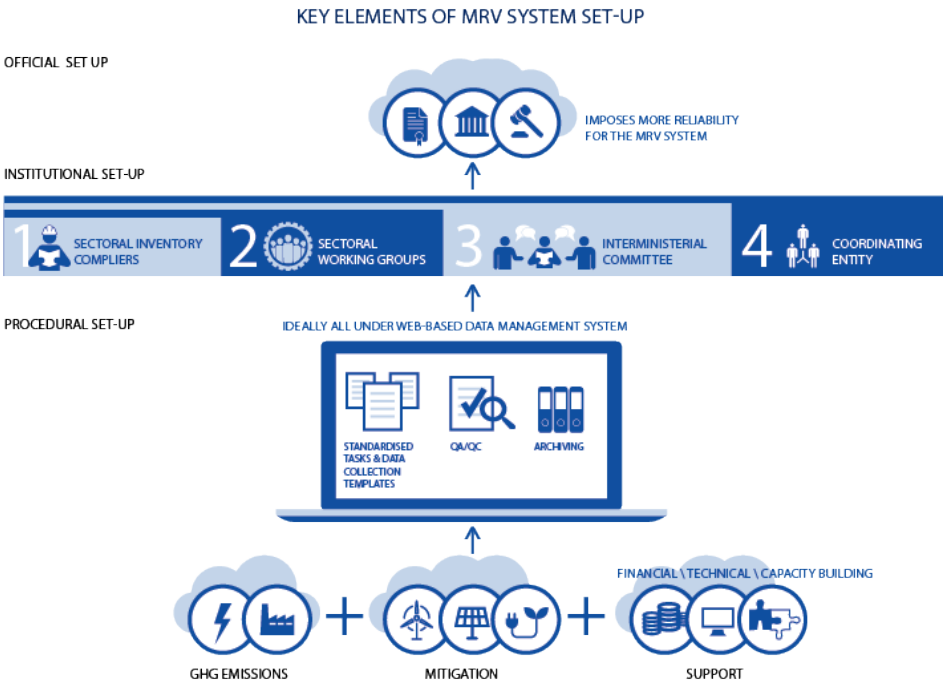


Figure designed and developed by NIRAS

[11] Samah Elsayed, World Resources Institute (WRI) , 2013 "Knowledge Product: Institutional Arrangements for MRV', page 6
[12] Samah Elsayed, World Resources Institute (WRI) , 2013 "Knowledge Product: Institutional Arrangements for MRV', page 6

3. CAPACITY BUILDING FOR MRV

Capacity building can be designed in many ways, depending on the specific project objectives. In order to have greater inclusiveness and create strong ownership within the target countries, several important building blocks that would ensure a successful capacity building intervention are identified. The building blocks that should be included into the design include:

- Needs-Based Assessment: Tailored Capacity Building Plan
- Inclusive: Capacity Building across governmental institutions and the private sector
- Sustainable: Creation of an MRV system through an integrated institutional set-up
- Practical: Pilot implementation in selected sub-sectors that can be replicated in other sectors
- Beneficial: Create benefits for all relevant stakeholders and sectors
- Experience sharing: Wider dissemination and knowledge transfer

The above building blocks, which are also in line with the Paris Agreement's recommendations for providing inclusive capacity building, will create the base for country ownership while helping the countries build capacity utilizing a needs-based approach. Figure 3 summarises key elements mentioned above which are required to launch a successful capacity building project.

Figure 3. Building blocks for a successful capacity building project

Figure developed by NIRAS

3.1 NEEDS-BASED: TAILORED CAPACITY BUILDING PLAN

Most developing countries will need to build institutional capacity to be able to follow both the existing UNFCCC reporting requirements and the post-Paris reporting requirements. Although such additional capacity is needed in general, the range of new skills required will be country-specific. Consequently, each country will need to identify and target priority areas that are most in need for capacity building. In order to reflect each country's specific circumstances, a capacity building project should start with a Needs-Based Assessment. The outcomes of the assessment will create the basis for a tailored capacity-building plan.

The Needs-Based Assessment should start with a review of national circumstances. It is important to conduct consultations with all relevant sectors. In addition, it is crucial to actively engage the agency/department responsible for climate MRV, as well as the UNFCCC focal point, both of which typically reside within a country's ministry of environment.

AVAILABILITY OF SYSTEMS AND STAFF

Each sector's strengths and weaknesses can be reviewed against a set of criteria that are deemed important for the capacity building project and the country. The below criteria can be used as the basis for the assessment:

- Availability of templates for reporting raw data relevant to GHG estimation
- Availability of templates for reporting GHG emissions
- Availability of trained staff for raw data collection
- Availability of trained staff for GHG estimation
- Availability of a system for reporting raw data relevant to GHG estimation
- Availability of a system for reporting GHG emissions
- Availability of procedures for the flow of data
- Availability of clear roles and responsibilities for different stakeholders
- Availability of a QA/QC system for reports
- Availability of a data archiving system
- Documentation of data sources, assumptions, and calculation methods

By assessing each relevant sector by applying the above criteria, the current status of MRV in the country can be well understood.

ASSESSMENT TOOLS

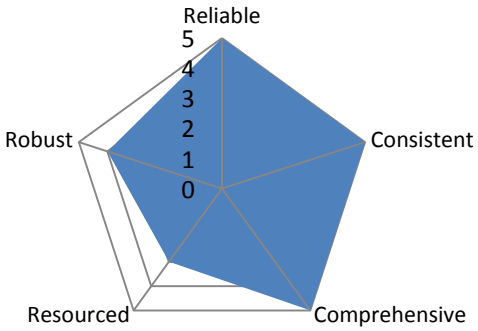
It is further recommended that the national MRV system be assessed in a systematic and objective way. A tool that can be used is a radar graph, which can visually display the strengths and weaknesses of the current system. The radar graph provides a method of displaying multivariate data on a two-dimensional chart and therefore provides an aggregate view of a system's strengths and weaknesses. The radar graph can also be useful when comparing results, for example between countries. Figure 4 below presents an example radar graph, where the MRV system ofcountry X has been assessed against five criteria.

The following five questions are intended to assist with the assessment of a national MRV system. However, the questions and their respective numbers can be changed to suit the purpose of the intended capacity building intervention.

1) **Reliable** official framework: Does the legal instrument ensure an effective MRV process?
2) **Consistent** institutional set-up: Is MRV done ad-hoc or regularly / continually over time?
3) **Comprehensive** institutional arrangements: Are all sectors and stakeholders involved and committed?
4) **Resources** to carry out MRV: Are resources sufficient and tasks properly delegated?
5) **Robust** procedures in place: Are there detailed reporting templates for all MRV elements, including QC/QA?

Figure 4 . Example radar assessment: Strengths and Weaknesses of Country X MRV system against the above criteria.

Criteria	Scale: 0-5 (weak to strong)
Reliable	5
Consistent	5
Comprehensive	5
Resourced	3
Robust	4



Figures developed by NIRAS

ESTABLISH A CAPACITY BUILDING PLAN

The next step is to establish a Capacity Building Plan based on the above assessment. The capacity building plan can be comprehensive or based on specific elements of the system that needs to be prioritized. The available resources of the capacity building project are also taken into account when developing the tailored capacity building plan. General elements of a Capacity Building Plan could consist of the following:

1. National GHG inventory by sector
    - Dataflow and procedures
    - Raw Data Collection
    - QA/QC system
    - Institutional set-up for MRV
    - Legal set-up for MRV
2. MRV of Mitigation Actions and their effects
    - Dataflow and procedures including sustainable development effects and progress towards implementing UNFCCC protocols
    - QA/QC system
    - Institutional set-up of MRV
    - Legal set-up of MRV
3. MRV of support needed and received
    - Dataflow and procedures to report on finance, technical assistance, and capacity building received
    - QA/QC system: verification of data
    - Institutional set-up of MRV
    - Legal set-up of MRV

In many cases the legal and institutional set-up for MRV is the same for all three areas: GHG inventory, mitigation actions, and support. Comparing the results of the Needs-Based Assessment against the above key MRV elements should assist in defining a specific capacity building plan. The plan should also quantify the number of days required for each activity to be implemented. Furthermore, it is important that the plan is designed in consultation with the relevant stakeholders and approved by the relevant MRV agency/country counterpart. A timeline should be set for the chosen capacity building activities.

The plan should also identify the target stakeholders in each key sector and sub-sector. Early mapping of stakeholders is necessary in order to start the communication. In many countries, communication is a crucial tool for the success of the project.

It is also recommended that the capacity building plan describes the approach for delivering training activities. These could be a mixture of lectures, practical exercises, structured discussions, case studies, and homework for the workshops**.** It is strongly recommended that the target audience is involved in the training by means of interactive discussions and exercises, which would ensure greater learning benefit and impact. It has been shown that trainees learn in different ways, for example through visual stimulation, verbal interaction, and learning-by-doing.

It is likely that some stakeholders neither understand the need for an enhanced MRV system nor understand their role in the process. Therefore, the capacity building plan should allocate time to explain the basics of climate change, the UNFCCC process, and its requirements. If the trainees are not motivated to carry out the task, the project is unlikely to succeed. Below, in Box 1, is an example from Nigeria for the process of establishing a capacity building plan.

BOX 1 Case Study: Capacity Building Plan from Nigeria

Nigeria needed to increase institutional capacity to carry out climate-related MRV, which means the ability to:

- Develop comprehensive, detailed and accurate national GHG inventories;
- Prepare the required information for UNFCCC reporting such as NDCs and BURs;
- Monitor and report on climate mitigation actions and financial support.

The scope and depth of the Capacity Building Plan for Nigeria was tailored to reflect a number of country-specific factors, including but not limited to:

- Current level of technical capability to carry out MRV;
- Level of ambition and commitment to advancing the national MRV capabilities;
- Stakeholders to be trained in terms of:
    - Public sector institutions vs. industry and private sector;
    - Senior staff vs. technical level staff.

Within the Capacity Building Plan, several elements were assessed on their availability in each sector:

Sector: / Element:	Environment	Energy	Transport	Industry	LULUCF*	Waste
Availability of templates for reporting raw data relevant to GHG estimation	Partly available	Partly available	Partly available	Not available	Partly available	Available
Availability of templates for reporting GHG emissions	Partly available	Partly available	Partly available	Partly available	Partly available	Available
Availability of trained staff for raw data collection	Partly available	Available	Partly available	Available	Partly available	Partly available
Availability of trained staff for GHG estimation	Available	Partly available	Partly available	Not available	Partly available	Partly available
Availability of a system for reporting raw data relevant to GHG estimation	Partly available	Partly available	Partly available	Available	Partly available	Available
Availability of a system for reporting GHG emissions	Not available	Partly available	Partly available	Partly available	Partly available	Available
Availability of procedures for the flow of data	Partly available	Partly available	Partly available	Partly available	Partly available	Partly available
Availability of clear roles and responsibilities for different stake-holders	Partly available	Not available	Partly available	Available	Partly available	Partly available
QA/QC system for the reports	Partly available	Partly available	Partly available	Available	Partly available	Partly available
Availability of a data archiving system	Partly available	Partly available	Partly available	Available	Partly available	Available
Documentation of data sources, assumptions, and calculation methodologies	Partly available	Partly available	Partly available	Available	Partly available	Available

Available | Partly available | Not available

Based on the above assessment and further stakeholder consultation, a summary matrix was established to highlight capacity building priorities for each sector/ institution. Finally, after consultations and based on country priorities, specific capacity building workshops were agreed upon for the following areas:

- MRV system development
- GHG Inventory
- MRV of mitigation actions

Box developed by NIRAS

3.2 INCLUSIVE: CAPACITY BUILDING OF GOVERNMENTAL INSTITUTIONS AND PRIVATE SECTOR

For a project to be inclusive, it will need to bring on-board all key stakeholders across all relevant sectors. This means engaging with applicable government institutions, industry, and private sector entities. Government institutions typically include ministries, departments, and agencies that are funded through the national budget. Industry refers to the large industrial companies and their sector-specific associations, which in some developing countries could still be majority government-owned. The private sector represents a range of actors from small and medium enterprises, to service providers and individual consultants. In addition, other stakeholders that should be involved in the process if relevant are research institutes, academia, and civil society organisations. In other words, reaching out to as many people as possible will allow the project to take a step further with both improving the data flow from all sectors and spreading the learning benefits more broadly. Moreover, this helps to strengthen the dissemination of knowledge in different sectors in the country which enables the achievement of strong results in the future. Figure 5 shows key sectors and entities to be involved in climate MRV. Furthermore, Including diverse participants and stakeholders from the target country at early stages of designing the capacity building activities is important for developing a robust and tailored capacity building approach.

Figure 5. Examples of entities to engage for climate MRV.

Cross-Sectoral: • Ministry of Environment / Environmental Agency • National Statistics Agency • National Committee on Climate Change • Ministry of Finance / Treasury	**Energy:** • **Ministry of Energy / Electricity / Power** • **Ministry of Petroleum/Natural gas/Coal** • **Ministry of Transport** • **National Electricity, Coal, Oil & Gas Companies** • **Energy regulator(s)**
Industry: • **Ministry of Industry / Minerals** • **Industry associations** • **Major industrial companies**	**Agriculture, Forestry & Other Land Use Change:** • Ministry of Agriculture / Land / Forestry / Livestock and relevant agencies • Agricultural / Forestry associations • Major agricultural and forestry companies
Waste: • Ministry of Housing / Local development • Solid Waste Management & Waste Water Agency	**National experts:** • Sector-specific experts and consultants • University lecturers & researchers • NGOs and Community Organisations

Figure developed by NIRAS

In Box 2 below is an example of the inclusive approach.

Box 2 Case Study: Inclusiveness

The European Commission's capacity building project on MRV of the GHG emissions and actions in developing countries supported a group of seven African countries in meeting UNFCCC reporting requirements. The participating countries were Algeria, Angola, Egypt, Ethiopia, Ghana, Nigeria and Senegal. Through a systematic and tailored approach to each country, this project used the momentum of the Paris Agreement at COP 21 to motivate the countries to learn and enhance their institutional capacity in climate MRV. The project comprised two phases. A 'scoping' Phase 1 included fact-finding missions to each country and stakeholder consultations to gather relevant information and views. Its purpose was to assess the country's readiness to absorb capacity-building support and build a sustainable climate MRV system. The missions helped to identify and meet key stakeholders relevant to climate MRV and better understand the current status in order to define the capacity building approach. The meetings were used to discuss issues such as institutional capacity to carry out comprehensive MRV, the status and needs of the national MRV system, opportunities and challenges for fulfilling reporting requirements under the UNFCCC, and capacity needs.

In addition to making use of synergies and lessons learnt from other climate change actions such as CDM, LECB project, and Africa LEDS Partnership, the EU project adopted a participatory approach as a way to ensure sufficient local "buy-in", as well as networking with regional partners and existing projects. Phase 1 of the project produced country summary reports including an assessment of the country's capacity building needs for each sector and institutions related to climate change. The fact-finding phase enabled the project to provide a platform for participants across all sectors and levels of experience to collaborate. Meetings were also held with senior government officials from several key ministries, agencies, and state-owned companies. In consultation with the UNFCCC focal point in the country (typically at the ministry of environment), and making use of previous climate change initiatives, the EU project was able to identify and reach out to proactive NGOs, consultants, and private companies and involve them early on in the discussion of how to improve the national climate MRV system in the country. These stakeholder meetings resulted in tailored capacity building plans for the countries and identified key stakeholders to include in each capacity building activity in order to ensure proper dissemination of knowledge and long-term results.

Box prepared by NIRAS

3.3 SUSTAINABLE: INTEGRATED INSTITUTIONAL SET-UP TO ENSURE A SUSTAINABLE SYSTEM

Institutional set-up is one of the core elements of an MRV system. Having a sustainable institutional set-up that functions on a continuous basis is important for meeting the reporting requirements in a timely manner. It allows the country to communicate information relevant to the implementation of the Convention, such as GHG emissions, mitigation actions, and support in the NCs and BURs. Institutional arrangements help to mobilise and co-ordinate the available resources—human and financial—to produce more technically robust reports and meet the required frequency of submissions to the UNFCCC.

In order to prepare NCs every four years and a BUR every two years, both of which require a national GHG inventory, countries need to make the transition from an ad-hoc MRV approach to a more continuous process involving permanent national teams. According to the BUR Guidelines, non-Annex I Parties shall submit a GHG inventory update report as part of their BURs, which is to be done every two years. Therefore, it is recommended that Parties put in place permanent procedures and structures for MRV. Thus, adequate institutional arrangements can assist countries to meet reporting requirements under the Convention, build national capacities, and ensure sustainability of reporting

processes, inform national and international policymakers at different levels, as well as assist in institutionalising activities relating to reporting on climate change.[13]

The institutional set-up is a critical building block for short- and long-term action on climate change. The challenge in most of the developing world is that many institutions that fulfil key MRV functions are weak or absent. Building a sustainable climate MRV institutional set-up will require long-term and potentially fundamental transformation. While there is no single set of institutional arrangements that can be considered "best practice", in order to build a sustainable institutional set-up the following steps should be considered while developing the system:

- Analyse the current and existing climate change policy framework and build upon it.
- Identify the focal point and coordinating entity and define their roles and responsibilities.
- Engage the ministries relevant to climate change data collection including GHG inventory, mitigation actions, and support received. An inter-ministerial body / steering committee could be effective in supervising the MRV work.
- Mainstream the requirements of the Convention among different ministries and concerned entities. Preferably, introduce a climate change/MRV unit, or focal point, in each ministry.
- Harmonise mitigation actions in all ministries to be in line with the national strategies such as the national sustainable development strategy.
- National statistics office is typically an essential source of data especially for GHG inventory activity data.
- Ensure direct data flow between the national statistics office, relevant ministries and the coordinating entity.
- Create a Quality Assurance (QA) entity to review data and reports before submission to UNFCCC.
- Develop technical support working groups that rely on national experts who can provide technical assistance for different entities of the MRV system.
- Develop a data archiving system.

The following Box 3 Case Study shows Egypt's experience with building a sustainable institutional set-up for climate relevant MRV activities.

[13] UNFCCC, 2014, "Toolkit for non-Annex I Parties on establishing and maintaining institutional arrangements for preparing national communications and biennial update reports".

Box 3 Case Study: Sustainable Approach from Egypt Box prepared by NIRAS

As part of Egypt's commitment to the Paris Agreement, it realised the importance of establishing an elaborate and extensive MRV system for tracking GHG emissions, mitigation actions, support needed and received, and adaptation. Egypt analysed the current institutional set-up and was able to formulate a country specific, high-level strategy to establish certain frameworks and systems relevant to building a sustainable institutional set-up for climate relevant MRV activities. The strategy provides the main activities and suggested improvements based on inputs from experts and key stakeholders to move towards a sustainable MRV system in the long term. The proposed strategy builds on the experience gained during the scoping mission in Egypt during Phase 1 of the EU MRV Africa project. The proposed strategy encompasses four main tracks, namely: Inventory, Mitigation Actions, Support and Adaptation. In addition, the roles and responsibilities, capabilities and capacities of the various entities involved are covered.

Most government stakeholders, including the Ministry of Environment and all line Ministries with a stake in the climate agenda, showed a strong interest in developing the system in terms of providing information, participating in the stakeholders' consultation, and identifying areas in need for enhancement. While it was demonstrated that in many sectors there are well-established or recently-introduced mechanisms for MRV of GHGs, a number of gaps and areas for improvement were also flagged. The latter include improving the accuracy and availability of data in some sectors of the economy; further disaggregating GHG emissions data in order to enable better policy planning and targeting of interventions; enhancing and streamlining communication among key ministries in terms of data sharing; and collaboration to meet the reporting requirements under the current UNFCCC.

Although the MRV system is not yet institutionalised in Egypt, there is a solid foundation that can accommodate building a sustainable MRV institutional set-up by implementing a set of improvements, including setting clear roles and responsibilities. The established National Climate Change Council is proposed to have the supervisory role for MRV activities. The current Climate Change Central Department under the ministry of environment is proposed to be the coordinating entity for the MRV system. The coordinating entity will undertake a certain set of technical and coordination responsibilities for proper functioning of the MRV system.

The GHG inventory data is characterised to be national and static and accordingly, for the GHG inventory track, the national statistics office namely Central Agency for Public Mobilisation and Statistics (CAPMAS) will be responsible for collecting GHG inventory data. The Mitigation track will involve the Ministry of Planning which provides the strategies and vision for the nation such as Sustainable Development Strategy 2030 and will harmonise mitigation actions across all ministerial entities. Each ministry will have an MRV unit responsible for quantifying the actual GHG reductions resulting from the mitigation actions implementation. These ministries will submit an annual Report directly to the Coordinating Entity providing information about the status of mitigation actions implementation. The Ministry of Investment & International Cooperation, the Ministry of Finance and donor-funded projects will provide data on the finance of the different climate change related activities (including domestic resources and international financial support). For the adaptation track, the relevant ministries such as the Ministry of Irrigation and Water Resources will report to the coordinating entity on the progress of the adaptation actions and the main results achieved.

To serve the four institutional tracks, an MRV focal unit in all key ministries will facilitate the activities of the system. It is proposed to have a quality assurance working group to review and verify all reports produced by the coordinating entity (e.g. BUR, NC) prior to submission to the National Climate Change Council before final submission to the UNFCCC. The formation of the QA-WG can start by a limited number of experts who can be responsible for quality assurance activities. In the long term, this working group can spin-off different groups: one for inventory, a second for mitigation actions a third for support and a fourth on adaptation. In addition, A Technical Support Working Group for MRV is proposed to be created to provide technical assistance and guidance to the coordinating entity, CAPMAS and the relevant ministries. This Technical Working Group may be a private independent entity such a consulting firm or a group of key experts and in the long term it can also spin-off different groups as proposed. Moreover, IPCC 2006 software is proposed to be used as national database for data archiving. A time frame was set for the current institutional system to accommodate the proposed improvement. The goal is to implement the improvements before 2020.

3.4 PRACTICAL: PILOT IMPLEMENTATION IN SELECTED SUB-SECTORS THAT CAN BE REPLICATED IN OTHER SECTORS

Under the umbrella of the Convention, countries are expected to report their national GHG inventory in the NC and also in the BUR. To prepare a national GHG inventory, the main GHG sources and sinks have to be clearly identified. The Convention has not set out methodologies for the direct measurement of GHG emissions, but Parties rely on estimation methodologies developed by the IPCC as requested in the guidelines for NCs and BURs.[14] The IPCC Greenhouse Gas Guidelines have generated detailed step-by-step methodologies for estimating GHG emissions by sources and removals by sinks. Over time, the guidelines have been updated to add more categories and provide improved methods. The concept of the IPCC Guidelines is that greenhouse gas emissions and removals are divided into four main sectors: Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry and Other Land Use (AFOLU) and, Waste. There are different methodological Tiers for each category of emissions source or removal to accommodate the different capacities of countries. The simplest approach is given under Tier 1, which utilises more aggregated national data and IPCC default emission factors. It is followed by Tier 2 which uses some default parameters, but also requires good quality country-specific parameters. Tier 3 requires more detailed, data intensive, nationally developed, and good quality (often utility-level) data to estimate emissions.

In order to apply any of the methodological Tiers, data needs to be collected such that data needs to be collected such that emissions or impact of mitigation actions can be sufficiently estimated in each sector. Procedural setup is extremely important in each of the sectors in order to ensure a functional MRV system. Moreover, the detailed institutional setup in each sector should be developed and integrated into the national institutional setup of the MRV system. Formalised data collection activities that are suitable to the national circumstances of each country should be present to allow for development of the inventory. It is important to identify data collection procedures that are essential for finding and processing existing data or otherwise generate new data through surveys or measurement methods. National statistics offices usually play an important role in data collection. The quality of the data collected will have an impact on the emissions estimates in the inventory. Implementation of the MRV system in one selected sector is very important in order to start developing the procedural setup of the MRV system. Therefore, it is highly recommended to select one sector (or sub-sector) and develop the institutional setup of such a sector in addition to developing the data collection forms and quality control and quality assurance procedures that should be employed. This will ensure testing on the ground of the functioning of the MRV system and identifying obstacles and barriers that should be avoided for future MRV activities. Once the MRV system is well-developed and functional in the selected sub-sector, it can be easily replicated in other sectors.

When developing the institutional and procedural setup of any sector, the following key questions will facilitate the understanding of the sector:

- What is the current institutional set-up for the sector?
- Who are the key stakeholders involved (custodians of data) and what are their roles and responsibilities?
- What are the different sources of data?
- How easy is it to obtain the data?
- In what form is the data available?
- How can QA/QC checks be applied on the data?
- What is the institutional capacity building needed to maintain a sustainable MRV system?

[14] UNFCCC, Decision 17/CP.8 and Decision 2/CP.17, Annex III

The below case study Box 4 shows the success story of the implementation of the institutional and procedural setup in the selected solid waste disposal sites sub-sector in Egypt.

Box 4 Case Study: Pilot MRV Implementation in Solid Waste Disposal Sites Sub-Sector in Egypt

Waste is one of the most challenging sectors, especially in developing countries. This is owing to many factors including the absence of data on the amount of waste generated annually, waste composition, and disposal and treatment methods. Data are fragmented among agencies and are neither systemised nor publicly available. In addition, there is a lack of proper waste disposal, absence of waste surveys, existence of weak legislative base, and unclear institutional set-up for the sector.

Based on the IPCC guidelines, key parameters to be measured in the solid waste disposal sites sub-sector were identified, including: amount of waste disposed of per solid waste disposal site, types of solid waste disposal sites (managed, unmanaged, or uncategorised) and the composition of the collected waste. The first obstacle faced was understanding the institutional set-up of the sector in Egypt and the mechanism for information flow. The national statistics office in Egypt, CAPMAS, has the legal authority to collect information from any entity in the country and has direct connections with the key stakeholders of the waste sector. After several meetings with CAPMAS representatives and stakeholders, the current institutional set-up of the sector along with the information flow of waste data were identified. The waste sector data is collected by CAPMAS issuing a data collection form yearly to all its branches in the governorates all over Egypt. Each branch forwards the form to the local units in the governorate, which are responsible for the waste collection, to fill-in the form and send it back by the end of the year.

Some of the stakeholders, particularly in Cairo and Giza, which are the two largest governorates in Egypt, complained that the data collected from landfills sometimes have large discrepancies. Generally, most of the information related to the amount of waste reported to CAPMAS is based on estimation rather than accurate calculation or measurement of weight. Moreover, the collected data does not include waste amounts in rural areas.

In cooperation with CAPMAS, the waste collection forms that are distributed to all governorates were modified to accommodate data needed for GHG estimation. The application of the new revised form started in the 2018 data collection cycle. In addition, a form to facilitate compilation of the collected data in an organised way was developed for CAPMAS. Moreover, a new data collection form for official landfills was developed. The need for quality control and an attending quality assurance plan was inevitable, and therefore, a quality control and quality assurance plan was developed. The plan covers different levels of the waste institutional hierarchy to eliminate the discrepancy in the data collected, ensure good quality and completeness of the data, and safeguard good archiving procedures as well.

The main outcome of the sub-sectoral capacity building experience in Egypt is summarised as follows:

- Development of data collection forms for the solid waste disposal sites sub-sector
- Report on the institutional set-up of the sub-sector
- Establishment of quality control/quality assurance plan and description of procedures

Box prepared by NIRAS

3.5 EXPERIENCE SHARING: WIDER DISSEMINATION AND KNOWLEDGE TRANSFER

EXPERIENCE SHARING

Experience sharing is an important process, not only for individuals to learn from the relevant examples in other countries, but also for a country as a whole to obtain a comprehensive picture of their level of MRV system development. By sharing its experience, the country receives recognition and ownership for their effort and progress achieved, while also understanding better the need to continue to strengthen its MRV system.

When several countries are involved, sharing experiences among the countries is an excellent way for exchanging ideas and learning from each other. By focusing on experience sharing through regional events, the project can summarise key messages from the implemented activities, highlighting the lessons learnt and success factors. In addition, each participating country can describe its current MRV system and what actions it has carried out to improve the system. Box 5 presents a case study for a regional workshop that was very beneficial for countries in different stages of development of their MRV systems.

Box 5 Case Study: Regional Workshop – Sharing Experience

A Regional Workshop was hosted at the end of the MRV Africa project to share the experience gained by the phase-II countries, Egypt, Ethiopia and Nigeria - and disseminating best practice information to the other participating countries – Algeria, Angola, Ghana and Senegal. This workshop was attended by 16 participants representing the respective environmental and energy ministries and climate change departments.

In this workshop, thematic presentations by both core team experts and phase-II country officials were given and there were several structured panel discussions for the key elements of a good MRV system, namely official, institutional, and procedural set-up, with concrete examples from the participating countries. Furthermore, the workshop looked at the lessons learnt by several countries from preparing their first BURs and the next steps with administering the ICA process. In the last session of the regional workshop, each country was asked to assess their current MRV system and define five key actions for improvements, based on recommendations flagged during the workshop.

All country representatives were given an opportunity to either make a presentation and/or participate in panel discussions. Their presentations focused on the MRV elements of the pilot sector implementation in their country. The participants acknowledged the experience gained through this workshop, and the possibility to compare similar country situations and barriers faced. It was also noted at the end that this workshop had provided an opportunity to improve participants' MRV network.

Box prepared by NIRAS

KNOWLEDGE TRANSFER

In addition to experience sharing with other countries, it is also important to design the project in a way that the knowledge and skills stay in the country and are disseminated further. Capacity building projects tend to use international experts to train local professionals during capacity building activities. The capacity building project needs to make sure that this knowledge stays within the country after the finalization of the project. Therefore, the project must be designed in a way that allows retention of knowledge. One option is to use local experts alongside the international team during implementation of capacity building activities. Local experts should be involved in supporting the

international experts in the preparation of materials and actual training sessions. This ensures hands-on capacity building for the local experts which in turn would have a long-term impact in the country. Moreover, involving the local experts ensures that training materials are adapted to the local context.

Also, the project can provide further training opportunities other than traditional capacity building workshops. For example, when training a country in GHG inventories, the project can offer the best trainees in the workshops an extra incentive to take an online course on GHG inventory development in their specific sector (or in other/all sector(s)) with goal to have the participants in the UNFCCC Roster of experts. It is therefore important to thoroughly go through what additional effects the capacity building programme can create and at what cost.

3.6 BENEFICIAL: CREATE BENEFITS FOR ALL RELEVANT STAKEHOLDERS AND SECTORS

Within a multi-country project targeting improved national MRV systems, best practices should be identified and communicated to a larger audience beyond the direct project participants. In most cases, the capacity-building projects generate some great experiences and lessons learnt that other countries/stakeholders can benefit from. It is important to have a strategy for how to disseminate the information from the project. Lessons learnt can be showcased in different ways. In order to reach a broader public, a series of showcasing and marketing events should be designed. To reach a broad audience, the marketing approaches can be divided into specific steps, which can be summarised with the following points:

1. Direct marketing and showcasing through specific events that target a specific group of the public;
2. Semi-direct marketing e.g. through a webinar being able to reach a larger more diversified group of beneficiaries;
3. Global marketing- showcasing the projects and materials on the web for constant global visibility.

Figure 5.Marketing Approaches.

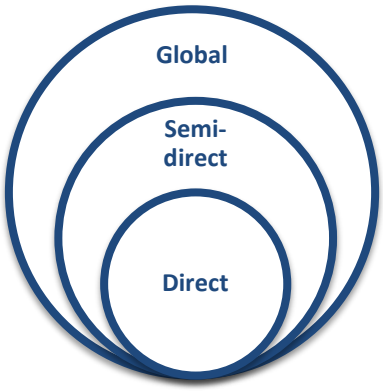


Figure developed by NIRAS

Therefore, in the direct marketing approach, events can thus be tailored to specifically target the audience and show the lessons learnt from the project. For semi-direct marketing, the visibility of the project should target a larger audience compared to the direct approach. This can be achieved in various ways e.g. through a webinar. A webinar helps a larger audience to benefit from the project experiences.

Many donor-funded projects experience problems with knowledge transfers when the project is finished. In some cases, the project implementation team does not transfer all information and knowledge to the donor or the interna-

tional community. This usually creates an overlap between donor projects that are not aware of other on-going initiatives in the same country(-ies). To avoid this and also create a greater benefit for all, the capacity building project should aim to disseminate knowledge by utilizing a global showcasing approach. This can be done through several web initiatives. One option is to create a project webpage where all training materials are made available, while also showcasing the project and its initiatives. In parallel, the project should be linked on relevant web directories.

Box 6 shows the example on how to successfully disseminate information from a project so that experiences generated can benefit a larger audience.

Box 6 Case Study: How to Disseminate Information Box prepared by NIRAS

Marketing Approach	Event / Action
Direct marketing and showcasing internationally through events at specific summits and workshops	The MRV Africa project was showcased directly at two UNFCCC Conference of the Parties meetings. At COP 22, a side event was organised on "Preparation of African Countries for Measurement, Reporting and Verification Requirements under Paris Agreement – Lessons Learnt". During COP 23, another side-event was organised on "Capacity Building in Climate-related MRV - Case studies and Lessons Learnt from Africa". The side-events advocated for a greater effort to develop holistic and sustainable national MRV systems across all African countries. They showcased the commitment and achievements of Ethiopia, Nigeria, and Egypt to develop such MRV systems. The event also demonstrated success stories from the methodologies used to achieve strong results in capacity building. Finally, the presentations and discussions aimed to encourage other African countries to launch their domestic MRV systems in order to meet the Paris Agreement requirements. The side events were open to the general public. Invitations where sent specifically to the UNFCCC focal points of African countries and to other interested groups from developing countries and the broader climate change community.
Semi-direct marketing, through a webinar	In order to further increase the dissemination of information, the project hosted a webinar, showcasing the lessons learnt and best practices from the project. By having a webinar, participation from a broad and diversified audience can be achieved. The webinar invited participating countries to present their respective examples generated during the project on the improved national capacity to enhance their MRV systems. Developing country participants were invited through the UNFCCC focal point email list; other organizations and interested parties were also invited. The event was promoted through the Climate L email list, which is an online community of climate change practitioners hosted by the International Institute for Sustainable Development.
Global marketing – showcasing the projects and materials through a website	To attract a broader audience and disseminate information for the benefit of the international community as a whole, the project developed a website. It provides access to over 100 thematic presentations on MRV used in the training sessions, and presents the subsectoral case studies developed within the project. The public website can be accessed at the URL: www.mrvafrica.com. The uploaded materials include training exercises, presentations, Excel tools, and specific case studies on sector implementation in Ethiopia, Nigeria, and Egypt. In this way, the project can extend its support to a larger public which can for free download the materials.

4. CONCLUSIONS AND RECOMMENDATIONS

The following are key recommendations for designing an MRV capacity building project:

- **Design the capacity building plan and workshops in cooperation with national stakeholders** to ensure that the content is relevant to the target audience. The sense of ownership over the capacity building plan and training events is crucial for active engagement.
- **Involvement of local experts.** The use of local trainers alongside international trainers at workshops contributed to achieving a greater focus on the national context. In addition, this can increase the knowledge of the local trainer, which ensures this knowledge remains in the country. The success of the project lies in engaging local technical experts and senior decision makers, as well as accurately targeting their needs for support activities in order to align with the expectations of local actors.
- **Importance of communication and engagement across relevant institutions.** The key to successful capacity building is transparent communication, applying the principles of inclusiveness, and collaboration. Communication, both vertically within ministries and horizontally between ministries, as well as communication with the participating stakeholders is important. Existing channels of communication—national climate change committees or equivalent, technical working groups, etc.—need to be fostered and utilised. In many cases, stakeholders do not understand why they need to build up their systems or provide data. Proper communication on the necessity and need for the capacity building activity is therefore crucial.
- **Encouraging active participation and hands–on-training**. The best way to maintain and expand the knowledge base is by applying the skills in practice. Finding the right balance between lecturing and exercises is crucial. It is advisable to spend more than 50% of the time on exercises, but this is subject to the specific context of the capacity building activity. Extensive hands-on training on IPCC methods, spread-sheets, and software is encouraged.
- **Create ownership** for participating countries by involving them in discussions and decisions. Key stakeholders should be involved in mapping out the current MRV system and describing its strengths, weaknesses, and the required actions to move forward to an enhanced MRV system. Similarly, key stakeholders should be involved in mapping out the selected pilot sub-sector, identifying actions required for improved reporting, as well as designing and testing of the MRV templates.
- **Recognising the best performers.** Offering tangible incentives for active participation motivates the audience to exert their best effort. Awarding a scholarship to enrol in additional on-line courses can be used as an incentive. Awards can also be configured on a smaller scale by verbally recognising the most active or best-performing participant in each capacity building activity.
- **Piloting** in one sector – applying in practice what has been learnt though the capacity building workshops. This offers the participating stakeholders an opportunity to apply they knowledge in practice and discuss and design the required steps in consultation with the capacity building experts. It is important that this experience can be further replicated in other sectors. Such an approach would ensure further experience is accumulated across a number of sectors.