



**International Partnership
on Mitigation and MRV**

Knowledge Product

Elements and Options for National MRV Systems

based on the Autumn School 2012 “MRV – today, tomorrow and the future”





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Elements and Options for National MRV Systems

based on the Autumn School of the International Partnership on Mitigation and MRV “MRV – today, tomorrow and the future”

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Federal Ministry for the
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Table of contents

Introduction	1
1 MRV basics	3
2 Domestic MRV systems	7
2.1 Setting up a domestic MRV system	7
2.2 Institutional structures for a domestic MRV system	10
2.3 Examples from the Autumn School	11
3 MRV of GHG emission levels and impacts of mitigation actions	14
3.1 Monitoring GHG emissions and emission reductions	15
3.2 Monitoring mitigative capacity improvements, co-benefits and co-costs	17
3.3 Reporting Approaches	23
3.4 Verification Approaches	24
4 MRV of public finance	29
5 Additional Resources	34



International Partnership on Mitigation and MRV

Introduction

In order to promote mutual learning and networking among its member countries, the International Partnership on Mitigation and MRV offers various events. The Partnership's first Autumn School on 'MRV – today, tomorrow and the future' took place from 15 to 23 October 2012 near Berlin in Germany. It was organised by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH with the support of Ecofys Germany GmbH on behalf of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). The Autumn School brought together 24 participants from 23 Partnership countries who work at the forefront of activities to set up monitoring (or measurement)¹, reporting, and verification MRV systems in their countries.

The Autumn School was designed as an opportunity for policy-makers, implementers and planners to gain in-depth knowledge of designing and implementing national MRV systems, including methodologies for data collection, reporting and verification. It also aimed to create awareness for the many advantages of MRV, including effective use of public budgets, credibility of national mitigation actions and enhanced access to climate finance. The Autumn School furthermore aimed to enable participants to better support national processes for building and institutionalising an MRV system for greenhouse gases (GHGs), mitigation action and support.

The following key issues were covered in the Autumn School:

- MRV requirements at the UNFCCC level
- MRV of emissions in national inventories
- MRV of nationally appropriate mitigation actions (NAMAs)
- MRV of public climate finance.

¹ In the Bali Action Plan in paragraph 1bii) the term MRV was coined as follows: *“Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner”*. Hence, the M of MRV stands for measurement in the context of the negotiations and in related activities. In the context of national MRV systems and their purpose, however, it often turned out in practice that a broader sense as reflected by the term 'Monitoring' might be more appropriate. That's why throughout this document the term 'Monitoring' is used when it comes to national MRV systems. However this should not be understood as a prerequisite but strictly in a sense of a recommendation.



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In covering these issues, experience exchange among participants was fostered through the presentation of country example cases and discussions, wherever possible.

This document aims to summarise the key findings from the MRV Autumn School and provides additional know-how to also serve as a resource to interested individuals.

The first chapter provides an introduction into the functions and roles related to MRV (“MRV Basics”) for readers that are completely new to the topic.

In chapter 2 “Domestic MRV Systems” the design and the setting up of a domestic system are elaborated.

Chapter 3 “MRV of GHG Emission Levels and Impacts of Mitigation Actions” takes a more technical look on how to monitor, report and verify emissions, emission reductions, removal of barriers to emission reductions and co-benefits.

Chapter 4 “MRV of Finance” discusses specific aspects of MRV related to public climate finance.

Chapter 5 “Additional Resources” includes links to selected resources for additional information.

Wherever possible, suggested tiered approaches have been included as examples, showing how countries can start with simplified approaches and improve their MRV system over time. These suggested tier levels have been compiled based on the discussions at the Autumn School. They are intended solely as supporting guidance and are not binding in any way.

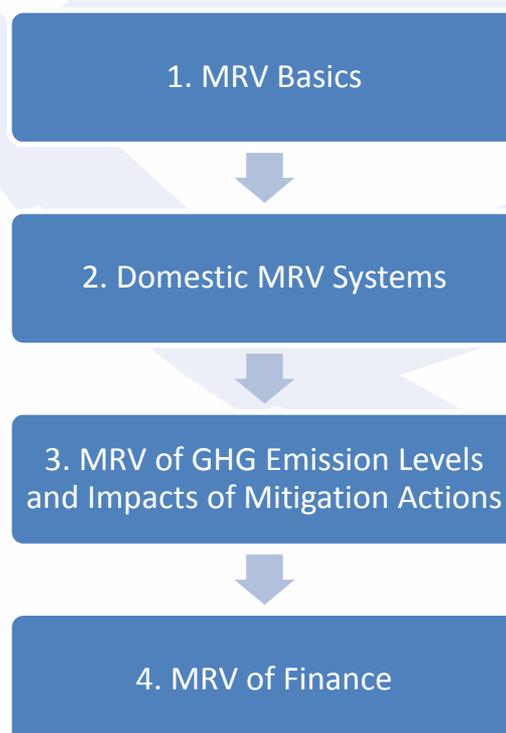


Figure 1 Chapter Overview



1 MRV basics

This section gives an overview on key issues related to Measurement, Reporting and Verification, on the functions of MRV, what can be MRVed and the role indicators play. As highlighted by one of the expert speakers during the Autumn School, MRV can be broken down into the four “E”s: (1) evidence (2) engagement; (3) evaluation and (4) enforcement at national level. A set of principles have been developed for national inventories under the UNFCCC. Countries might also find it helpful to use these principles for orientation when setting up MRV systems.

Principles for National Inventories under the UNFCCC:²

- Completeness
- Comparability
- Transparency
- Consistency
- Accuracy

Functions of MRV

The key function of MRV is enhancing transparency through the tracking of national GHG emission levels, the tracking of climate finance flows received or the impact of mitigation actions. MRV facilitates sharing information and lessons learnt and allows assessing whether set targets have been achieved. This creates transparency and shows the continuity of a country's actions, which internationally strengthens trust of climate finance donors and other investors. Transparent MRV approaches can improve comparability at national and international level thus supporting coherence between domestic and international MRV systems. Where detailed reporting on MRV approaches takes place, as in National Inventory Reports under the UNFCCC, this enhances the identification of best practice examples.

Nationally, MRV enhances capacities to generate and compile the information needed to plan, implement and coordinate individual mitigation activities. To this end, countries should design their national MRV systems accordingly to their needs and interests.

² UNFCCC, 2009b.



Key issues in MRV

Figure 2 below shows common issues related to MRV. In practice, the specific design of MRV will differ depending on the specific functions for which the MRV system shall serve. A country should decide what goals and level of activity are appropriate in each category. Monitoring (or measuring) involves the methods used to track specific activities and impacts. Reporting refers to the approach used to transparently communicate selected information to national stakeholders and/or the international community. Verification aims to ensure that selected reported information is accurate and complete.

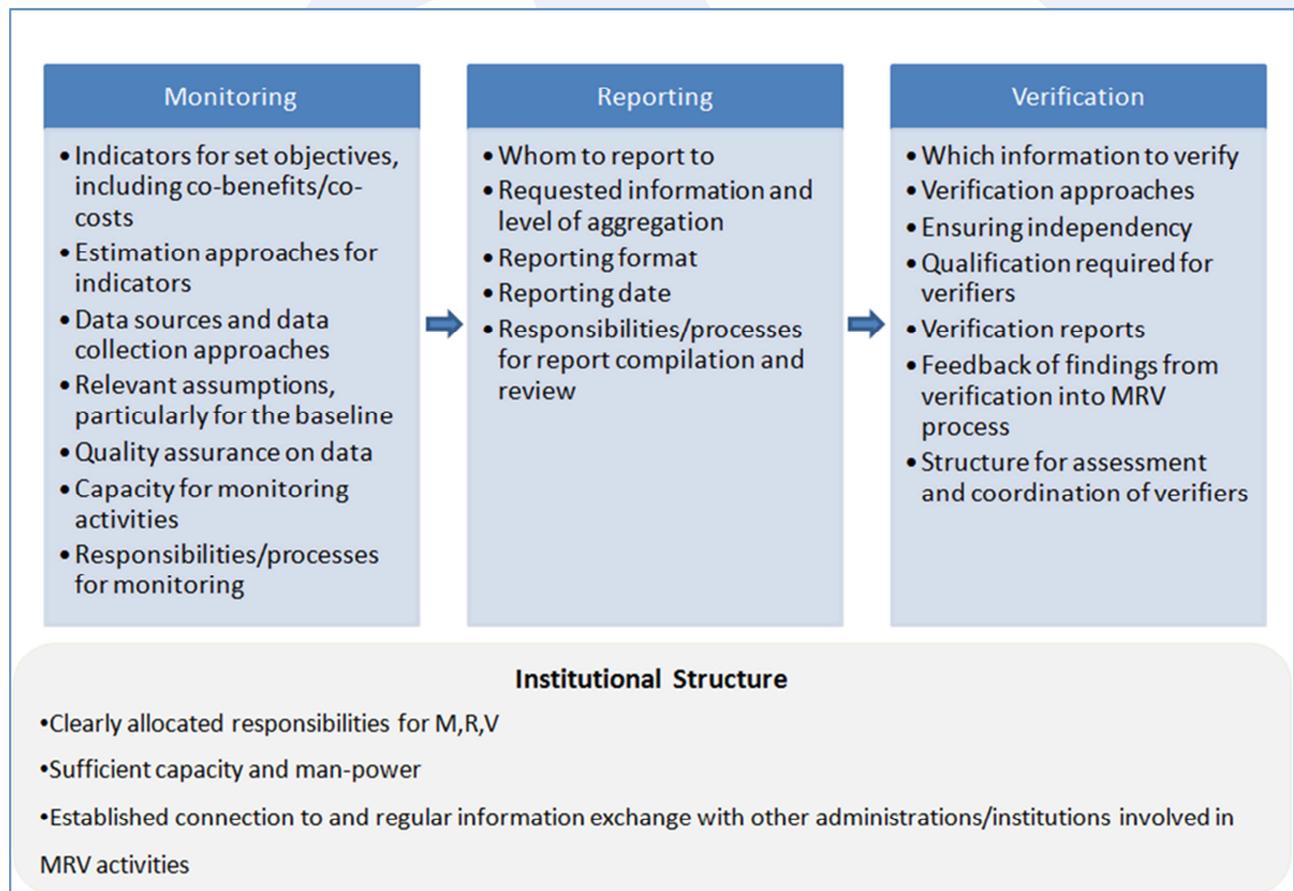


Figure 2 Key issues in MRV

Source: Authors

What can be MRVed?

In theory, MRV can be performed for any kind of objective set related to any kind of area. In this paper, we will focus on MRV related to GHG emissions, mitigation actions and climate finance flows to reflect the scope of MRV stipulated under the UNFCCC in the Durban Outcome 2011 (Annex III).



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The part of MRV that is most advanced in terms of methodologies and that many countries are most familiar with is the MRV of **GHG emission levels** in the form of National Inventories under the UNFCCC. With regards to mitigation actions, **GHG emission reductions** are most commonly MRVed. But mitigation actions might not always directly lead to emission reductions, as they might have to overcome barriers to emission reductions first, e.g. through capacity building, adjustment of the legal framework, introduction of specific technologies into national markets. We refer to the result of reducing barriers to emission reduction as increased mitigative capacity. Increasing the mitigative capacity is a legitimate aim of mitigation actions and should be MRVed, just as any other objective.

Furthermore, non-GHG effects might occur. These are impacts of mitigation actions which are not related to climate change, e.g. improvement of air quality, job creation, reduced resource use, etc. Where such impacts are objectives of a mitigation action, they should be MRVed as well.

Under certain conditions a mitigation action might also have negative impacts; we refer to these as co-costs. In general, potential negative impacts should be mitigated through the design of the mitigation action. Where a relevant risk of significant negative impacts is nevertheless seen, an MRV system should also cover these impacts.

Apart from GHG emission levels and the impacts of mitigation actions, climate finance flows should also be MRVed. Here, MRV activities might differ depending on whether MRV is performed by a donor or a receiver of climate finance. Furthermore the specific use of climate finance flows should be of interest, e.g. related to specific sectors of the receiving country or to specific purposes, e.g. capacity building or technology transfer.

MRV as part of policy and action design

In the context of setting-up an MRV system to monitor and track progress of the transformation to a Low Emissions Development, MRV goes beyond emissions inventories and reflects impacts of policies and actions (and eventually the flows of climate finance and support). In theory, one would like to track all objectives of a mitigation action in order to be able to show whether the set objectives have been achieved. One might also decide to track further impacts, e.g. potential co-costs or additional non-GHG benefits. Where MRV is related to the impacts of mitigation actions, the MRV system should be developed during the design phase of mitigation actions (see Figure 3 below). This allows the MRV system to be tailored to the specific objectives as well as other relevant impacts of the mitigation action. This approach also ensures the MRV system is operational when the mitigation action is implemented, thus providing the desired data from the start. Evaluation of the data during or after the end of the mitigation action will show, whether the set objectives have been achieved. It will also allow



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the potential for improvement in the effectiveness of the mitigation measure to be identified. These findings can be used for improvement of the mitigation action (if still ongoing), future mitigation actions as well as the MRV system itself.

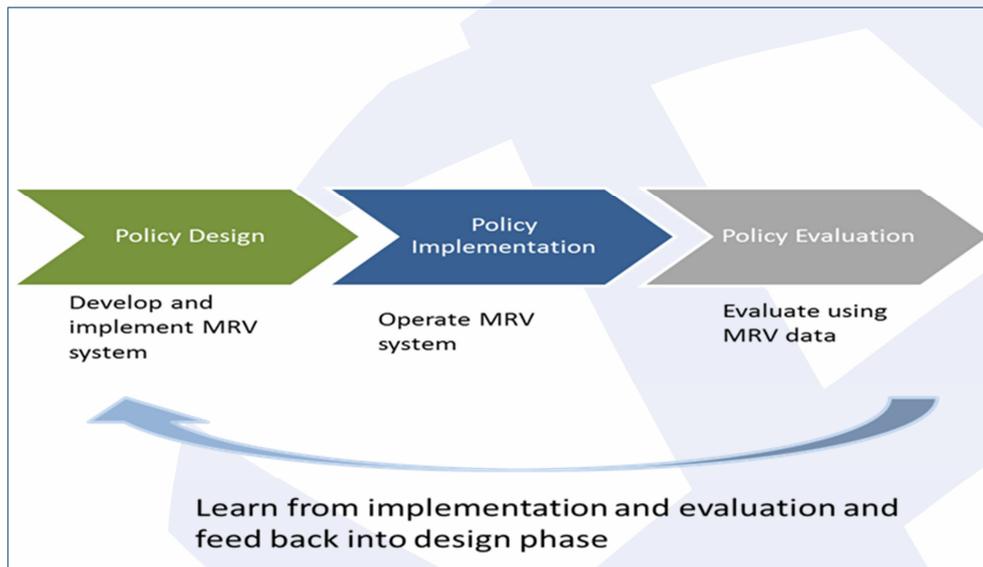


Figure 3 MRV in the policy cycle

Source: Authors



2 Domestic MRV systems

2.1 Setting up a domestic MRV system

What is a domestic MRV system? General guidelines for domestic MRV, such as for NAMAs, are still under negotiation, thus, there is no agreed definition yet. The common understanding at the Autumn School was that a domestic MRV system is the entirety of MRV activities related to climate change at the national level, including the coordination of these activities. Consider the many possible MRV activities related to climate change within a country, for example:

- A national GHG inventory under the UNFCCC
- National Communication/Biennial Update reports under the UNFCCC
- MRV for domestic or supported NAMAs
- MRV for national climate change policies, e.g. a building code
- MRV for a voluntary reduction target in a specific industry sector
- MRV for national mitigation goals

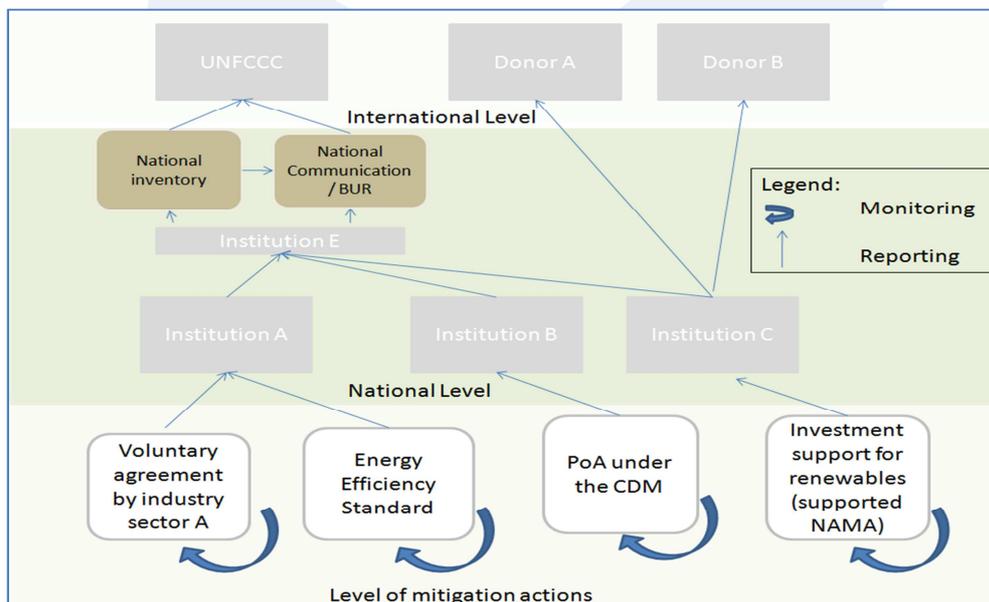


Figure 4 Example model for domestic MRV system

Source: Authors

Where several MRV activities at national level exist, overlaps might occur, which means double effort. Different MRV systems might monitor the same or similar data or report the same or similar data to various recipients, e.g. various donors, see Figure 4. Therefore, the various MRV activities ideally should be aligned to the extent possible from the beginning to avoid double effort and ensure comparability.



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The above indicates that the interactions between the various MRV systems should be considered as early as possible in their development. Therefore, in setting up a domestic MRV system, it is important to understand the (potentially) necessary types of MRV activities at national level and set clear objectives related to these activities. While a country will surely not be able to foresee every policy or action it might need to MRV over time, it can consider the broad categories of types of systems typically needed – e.g. MRVing GHG emission levels in the form of a national inventory, MRVing impacts of mitigation actions and MRVing climate finance. For these broad categories, a country can consider the existing national and international requirements, e.g. requirements for national inventories, and consider a suitable institutional framework to accommodate and coordinate domestic MRV activities.

Where the MRV systems use the same data, a country can reduce effort for MRV activities by aligning MRV approaches, e.g. with regards to data collection or reporting. Often the same data are needed at differing levels of aggregation. Countries can reduce effort by applying bottom-up or top-down approaches as most appropriate. Where both approaches are implemented for similar areas, they can be used for validation purposes, e.g. top-down data might be validated using the bottom-up figures.

In designing the specific components of national MRV systems, Autumn School participants agreed that the following questions are relevant:

- What are the objectives of the mitigation actions?
- Do we want to track non-GHG impacts of the mitigation action?
- What are suitable indicators for the set objectives and other impacts?
- Which data do we need for these indicators?
- Where can we find this data and how can we obtain it?
- Which data do we need to report to whom, how frequently and in which format?
- How can we ensure the validity of the reported data?

Successful set-up and operation of a national MRV system requires resources that are available over a longer timeframe. National and potentially also sectoral circumstances have to be considered when developing a domestic MRV system. This refers to conditions including reduction potentials, technologies, infrastructure, institutional structures, capacities, etc.



Recommendations from Autumn School participants for setting up a domestic MRV system

- Start now with what you have and develop it further over time.
- Ensure clear objectives, commitment (including resources!) and leadership as well as ownership for the system.
- Ensure a shared vision and ownership of all stakeholders through a participatory process.
- Assess the potential legal impacts of your plans.
- Plan enough time for the implementation of the system; a few months will not be enough.
- Plan and implement the necessary enabling environment (e.g. legislation).
- Plan and implement a strong enforcement framework.
- Carry out cost-benefit analysis of potential MRV options.
- Design the system to be flexible with regard to sectoral/national circumstances.
- Support the MRV system with emission-projections that are regularly updated to serve as a reality check.
- Over time, aim to establish an MRV system that covers all relevant domestic MRV activities, e.g. national inventory, NAMAs, CDM, etc.
- Aim to strike a balance between accuracy and practicability/cost in designing the MRV system.

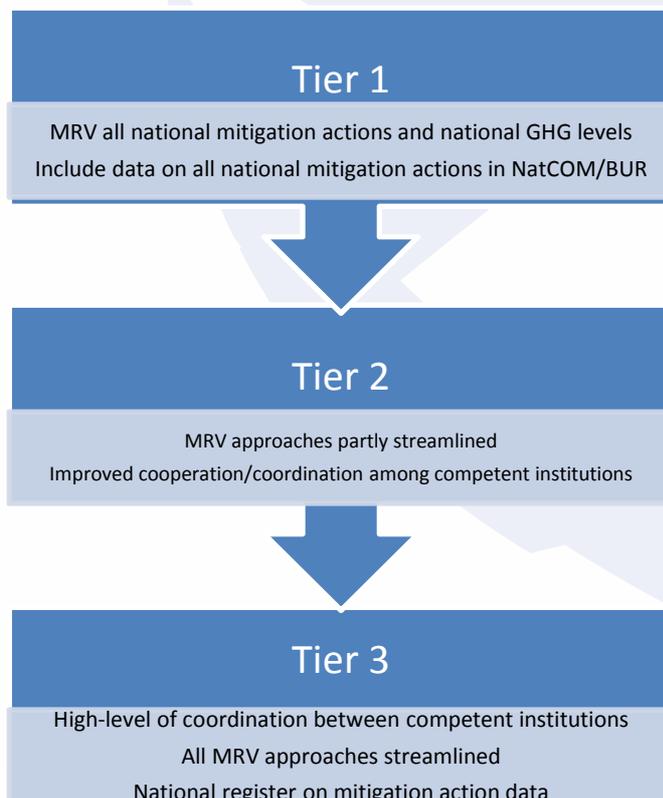


Figure 5 shows suggested tier levels for setting up a domestic MRV system. Tier 1 means covering all relevant MRV activities, e.g. a national inventory and supported as well as unsupported mitigation actions and related flows of support, but without applying common stringent methodologies for all emissions actions and support.

As a next step, Tier 2 means aligning MRV activities as well as coordinating the relevant institutions to a certain extent.

Tier 3 means a high level of coordination between the competent authority and alignment between MRV activities wherever potential for synergies exist based on clear rules, such as applying common methodologies and generating

Figure 5 Suggested tier levels for domestic MRV systems
Source: Authors



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comparable data. Further transparency could also be achieved through a national register on mitigation action data, e.g., Chile is setting up a register to show the results of its mitigation actions. The most appropriate tier depends on local circumstances. Tier 2 is a good level which countries should consider for orientation, when developing their initial MRV systems.

Example Switzerland: Development of the Swiss National Inventory

During the Autumn School, Switzerland showed an example case on their national inventory, which perfectly illustrates the above recommendation: Start now with what you have and develop it further over time.

The two first inventories were provided as part of the National Communications in 1994 and 1997. The first inventory covered only part of the Kyoto gases: CO₂, CH₄, N₂O. The review process supported the further development of the inventory, but from 1998-2001 only the filled common reporting formats were submitted. Only in 2002, after the first National Inventory Report containing all direct and indirect GHG was produced. In 2002, the first key category analysis and, in 2003, the first quantitative uncertainty analysis was performed. From 2003 onwards, after the ratification of the Kyoto Protocol, the national inventory system was built. The inventory reviews have greatly supported the further development of the inventory over time as they allow an experience exchange between inventory experts.

2.2 Institutional structures for a domestic MRV system

For any effective MRV system, clearly defined institutional structures with their respective responsibilities and the backing of a political mandate must be established, and information flows between the institutions involved must be determined. It seems efficient to use existing institutional structures as a basis, as far as possible. In order to reduce conflicts of interest, an independent agency with no connections to a specific ministry or an inter-ministerial committee might be an option. Knowledge management is also an essential element; countries should ensure that knowledge and capacities created through MRV activities remain in the public administration and not just in other institutions contracted to perform the work. Capturing institutional memory and archiving generated and reported information is essential in the long term for the development of a cost-effective MRV system that sustains built capacities in responsible institutions independent of individuals.



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Recommendations from the Autumn School for setting up institutional structures

- Secure the necessary political mandate over time and set up all necessary institutional arrangements for coordination, ensuring clearly defined responsibilities and avoiding conflicts of interest.
- Ensure staff has or are provided with the necessary capacities/expertise for their tasks.
- Ensure all necessary knowledge and data remain within the institutional structures.
- In developing a national MRV system, build on the existing institutional structures.
- Using a decentralised/integrated structure like an inter-ministerial committee can be helpful for the coordination of a national MRV system.

2.3 Examples from the Autumn School

Example Indonesia

Here, we present two example cases discussed at the Autumn School. These are provided as a source for inspiration, and not as a model which every country has to follow.

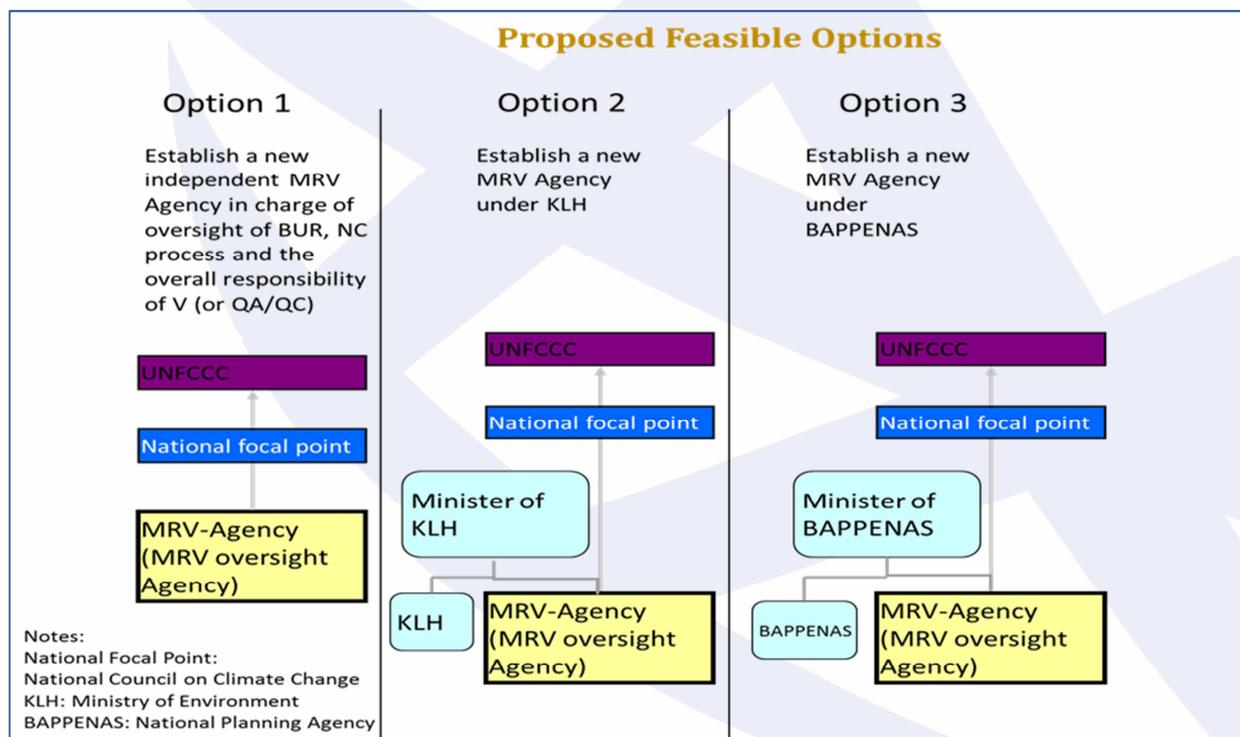


Figure 6 Options for an institutional structure for NAMAs from the National Council on Climate Change Indonesia

Indonesia published an assessment for a potential institutional structure related to MRV in April 2012. A clear need is seen to designate or establish an agency/department responsible



International Partnership on Mitigation and MRV

for the oversight of the MRV processes of the national inventory, mitigation actions and tracking support as well as overall QA/QC. Three core options were presented to the Autumn School, two of which integrate existing institutional structures (see Figure 6):

- establish a new independent MRV agency in charge of the oversight of Biennial Update Reports, the National Communication process and overall responsibility for Verification (or QA/QC);
- establish a new MRV agency under the Ministry of Environment, widening the responsibility of the current Agency of Inventories under the Environment Ministry;
- establish a new MRV agency under the National Planning Agency.

The second option seemed most favoured at the time of presenting it to the Autumn School.

Example Colombia

Colombia has developed a low-carbon development plan into which the design and implementation of NAMAs is integrated top down on the basis of sectoral plans. At the same time, bottom-up development of NAMAs through the sectors will take place. In this case, NAMAs have to comply with national development objectives and each will include development of appropriate MRV strategies for each NAMA. For example, the MRV strategy for a NAMA focusing on Transit Oriented Development could start by focusing on implementation metrics (e.g. was a station constructed as designed), and then move to process metrics (e.g. amount of new housing or new financial investments within 0.5 km of transit) over time.

One lesson learned so far is that the detailed assessment of emissions and mitigation options at the sectoral level provides a better overview and supports the development of NAMAs. Feasibility studies for mitigation actions should not be limited to mitigation potentials and costs, but encompass further key aspects, e.g. political, cultural and methodological aspects, and suggest MRV strategies in order to ensure successful implementation. For example, the availability, or lack, of data and metrics used in these detailed assessments can provide indications for practical MRV strategies as well.

Colombia requires all potential mitigation measures to have been presented to a Committee for Financial Management, which is under the Inter-institutional Commission for Climate Change (COMICC). This ensures consistent decisions and makes tracking easier, as there is a common 'point of entry' for initiatives. The Committee for Financial Management assesses the financial feasibility and financing options for initiatives and supports efforts to secure suitable funding. Further, it manages the budget resources for national policies and programmes related to climate change adaptation and mitigation. The Committee consists of



International Partnership on Mitigation and MRV

representatives of relevant ministries, e.g. environment, foreign affairs, finance and public credit, and of other institutions including the National Planning Department and the Adaptation Fund management team.

This example represents an institutional set up for a comprehensive information management system, including macroeconomic data for all economic measures, upon which all low carbon development actions are based.



3 MRV of GHG emission levels and impacts of mitigation actions

This section gives an overview on how to monitor emission levels – such as according to IPCC Guidelines - as well as impacts of mitigation actions – as, for instance, described in the GHG Protocol's Policies and Actions Accounting Standard. As an introduction, we explain the concept of indicators. Next, we outline the process described in the GHG Protocol's Policies and Actions Accounting Standard, as an example. We then present key approaches for the determination of emission levels and emission reductions as well as for mitigative capacity improvement and co-benefits as well as undesired impacts, so-called co-costs.

The box below presents recommendations generally applicable to monitoring.

Recommendations from the Autumn School related to Monitoring

- Use as robust as necessary and as simple as possible methodologies
- Select SMART indicators
- Use baselines reflecting local conditions for the assessment of impacts
- Construct time series of inventory data where possible
- Set standards for data
- Consider the use of an IT-based system for data evaluation and storage

From a technical perspective, indicators are quantitative or qualitative variables associated to a target value. Indicators are used to show whether the objectives of an action have been achieved or not. In order to be relevant, indicators must mirror final objectives or intermediate objectives of an action. Monitoring is the assessment of the indicator value, which can then be compared with the respective objective. The process of selecting indicators and setting targets for these indicators can be helpful in validating whether the desired objectives of a NAMA are realistic. Indicators should be formulated in a SMART manner to ensure their appropriateness in showing whether an objective has been achieved.



What does SMART mean?

1. Specific: indicators should be defined precisely, so there is no room for interpretation, whether the target has been achieved or not;
2. Measurable: it is possible to assess the value of the indicator during or after the implementation of the NAMA;
3. Achievable: the target associated to the indicator can be realistically reached by the NAMA activities within the set timeframe;
4. Relevant: the indicator is helpful in showing whether the desired outcome has been achieved;
5. Timely: the indicator specifies the timeframe for reaching the target set.

3.1 Monitoring GHG emissions

A wealth of approaches for the determination of GHG emissions and emission reductions exist. Most are based on measuring GHG emissions directly using continuous emission measurement systems or calculating emissions, considering an emission factor and an activity level.

With regards to GHG emissions, the IPCC Guidelines for national inventories are the most acknowledged source, which has influenced most of the other sources for GHG methodologies at different including sub-national, corporate and facility level, e.g. the GHG Protocol (WBCSD/WRI), or the methodologies under the EU ETS. Some methodologies are aimed at determining emission levels (IPCC, EU ETS).

The methods applied should be appropriate to the scope of monitoring (e.g. emissions from cattle or emissions from power generation). In choosing the appropriate accuracy of data – e.g. using statistical data vs. installation specific data or a national emission factor for fuel vs. an installation-specific one - one has to balance the costs related to data collection against the benefit of higher accuracy. Starting with simplified approaches and less accurate data and improving over time is a typical approach.

Monitoring approaches should always be laid down in written form at a high level of detail. This will ensure that the same approaches are used over time, thus facilitating comparability of data over time.

Private companies might be reluctant to provide data due to the efforts connected and for reasons of confidentiality. A solution can be a clear legal basis requiring the necessary data collection, but also ensuring confidentiality, e.g. through aggregation of data. Another option is memoranda of understanding (MOUs) between companies or trade associations and the respective institution performing the data collection.



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Figure 7 shows suggested levels of a tiered framework for assessing GHG emissions levels. The tiers differ mainly with regards to accuracy of activity data and emission factors. Tier 3 will not

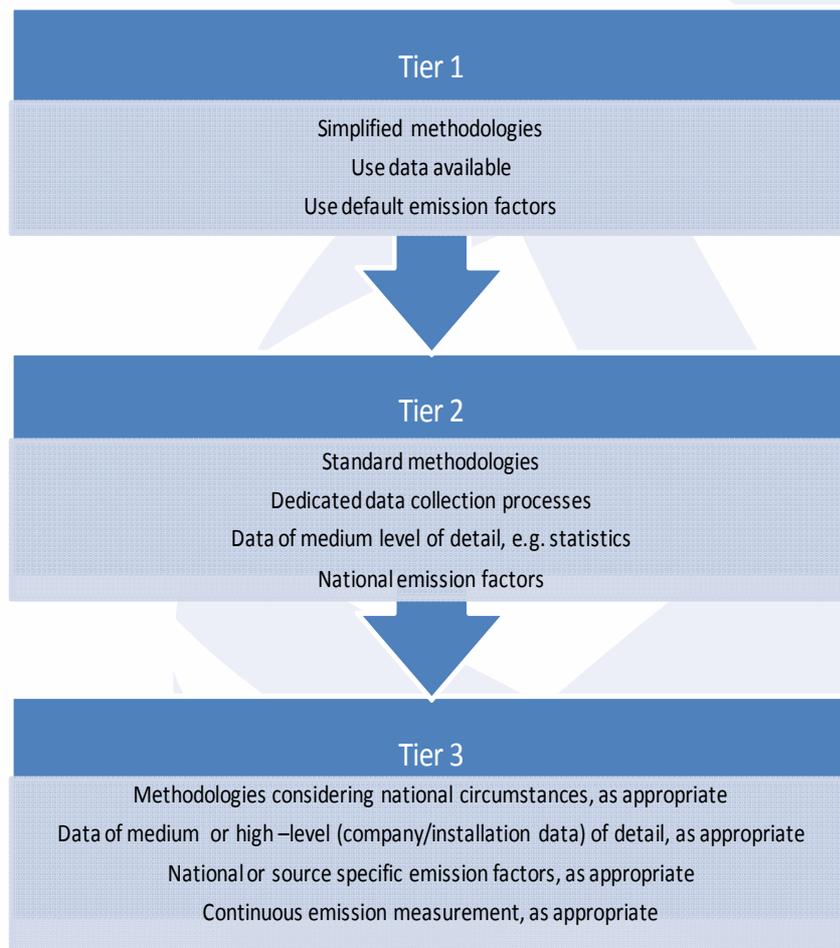


Figure 7 Suggested tier levels for GHG emission levels

Source: Authors

measurement.

be necessary in all cases. Countries should aim to strike a balance between the relevance of an emission source and the effort in quantifying emissions accurately. An example: During a visit at the German Federal Environment Agency, responsible for the German National Inventory, the Autumn School participants learned that for the cement sector the Agency prefers to use statistical data instead of installation-specific data reported under the EU Emission Trading system, as for the purposes of the inventory, the statistical data is often more accurate than single point measurements to potential margins of error in

References to selected protocols that can provide additional guidance on existing methods:

- GHG Protocol Project Protocol and Sector Toolsets:
<http://www.ghgprotocol.org/standards/project-protocol>; <http://www.ghgprotocol.org/calculation-tools>
- C40/ICLEI/WRI Global Protocol for Community Emissions:
<http://www.ghgprotocol.org/city-accounting>
- IPCC 2006 guidelines:
<http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>



3.2 Monitoring emission reductions and mitigative capacity improvements, co-benefits and co-costs of NAMAs

The MRV of NAMAs should ultimately quantify the achieved emission reductions, although at the same time NAMAs will also generate long-term and indirect effects on mitigative capacities and have co-benefits and co-costs which are often even more important than short-term direct emission reductions. Monitoring of emission reductions must, hence, strike a balance between relevance and accuracy of mitigation effects of NAMAs in order to justify costs of related measuring methodologies.

Methodologies for CDM/JI are aimed at determining short-term, direct emission reductions. MRV of NAMAs should learn from CDM/JI, but must not limit methodologies to those from the carbon market. Basically, an emission level is calculated, and for the determination of an emission reduction, a baseline level has to be calculated additionally so as to determine the difference between emission level and baseline level. The basic methodologies for calculating the levels are mostly the same, but assumptions to be used in these methodologies e.g. when setting the emission factor or activity levels for the baseline, will differ. Where emission reductions are achieved by the implementation of many similar, but smaller actions (e.g. replacement of cooking stoves), the effort for MRV approaches might be reduced by using sampling or standardised baselines. WRI is in the process of developing the *GHG Protocol Policies and Actions Accounting and Reporting Standard* designed to help users quantify the GHG effect of policies and actions.



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Assessing impacts of a policy

This overview of the general steps for assessing impacts of a policy or action is adapted from the new GHG Protocol's Policies and Actions Accounting Standard.

- Determine the scope:
 - Policy/Action: Define what is to be assessed, and whether to assess one policy or a package of similar policies. Identify the objectives of the mitigation action.
 - Purpose: Define the purpose of the measurement, including the audience
 - Approach: Determine general approach, e.g. accounting principles to be used and whether ex ante and/or ex post data is needed
- Identify the GHG effects of the policy or action:
 - Causal chain: Map the causal chain to identify all possible GHG effects of the policy or action.
 - Boundary: Select effects to include in the GHG assessment boundary.
- Establish methodology:
 - Indicators: Examine the objectives of the mitigation action and the causal chain to identify the appropriate indicators for the impacts you want to track. Consider using indicators for intermediate objectives or strongly related impacts – as a substitute - and set appropriate indicator targets.
 - Milestones: Identify milestones and suitable process indicators for each milestone to be able to track the implementation of the mitigation action.
 - Data: Identify the necessary data, data sources and data collection methods/frequencies for the chosen indicators.
- Estimate the GHG effects of the policy or action:
 - Baseline: Identify the status quo to which the objectives of the mitigation actions relate (e.g. current emission level, current capacity) and the likely development without the mitigation action (baseline scenario).
 - Apply data collection approaches for indicators, as appropriate for objective:
 - GHG effects ex ante: Quantify likely GHG effects before implementation, and/or
 - GHG effects ex post: Quantify GHG effects ex-post during or after policy implementation.
- Reporting: Report results of assessment and methodology used to relevant stakeholders.



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Particularly for rather long-term transformational changes which NAMAs are supposed to achieve, the non-GHG effects of mitigation actions are often more relevant than the direct, short-term emission reductions. Sustainable development co-benefits can be actually larger in many mitigation actions than the emission reduction effects. Methods for the monitoring of removal of barriers to emission reductions have not yet been compiled for the specific needs of mitigation activities. The CDM Gold Standard³ and the Social Carbon Standard⁴ have developed approaches for monitoring/measuring co-benefits for CDM. Suitable methodologies for barrier removal and co-benefits can also be found in social sciences, e.g. related to job creation, gender equality, technology transfer or capacity building and in environmental sciences related to air, soil and water quality. One key consideration to keep in mind with regards to monitoring/measuring barrier removal and co-benefits is that only where SMART objectives have been set, monitoring/measuring with SMART indicators is possible. Where the objectives are not specific enough or not realistic, setting a specific or realistic indicator – the basis for all MRV activities - will be difficult.

³ <http://www.cdmgoldstandard.org/>

⁴ <http://www.socialcarbon.org/>



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Barriers-to-Objectives Weighting method: How to quantify the results of increased mitigative capacity

Transformational change does not necessarily translate into short-term, direct emission reductions. Rather, overcoming barriers leads to sustainable changes, enabling the private sector to initiate a self-sustaining investment dynamic, and creating sustainable co-benefits as incentives for actors to use and maintain an innovation. Real, long-term, comprehensive transformations often depend on results that are difficult to define a unit for and to quantify, like overcoming a barrier.

The barriers-to-objective weighting method (BOW) is used for estimating the GHG reduction (in tonnes of CO₂ equivalents) achieved by projects that aim to increase the mitigative capacity of a country. The BOW assumes that a range of barriers prevent the implementation of certain climate protection measures. One, or several, of these barriers should be eliminated as output(s) achieved by the project. Once the obstructive barriers no longer exist, the climate protection measures can be implemented. This results in prevention of GHG emissions and therefore to a project impact. The BOW intends that experts weight the barriers according to their relevance. The contribution of the project to the implementation of a certain climate protection measure, and thus the contribution to GHG reduction is estimated by weighting the importance of all barriers that obstruct the implementation of the climate protection measure.

Step 1: Quantify technical mitigation potential or determine the objective of mitigation action, i.e. the GHG reduction. (The corresponding reduction factor of a mitigation activity is determined. This details how the impact can be interpreted as GHG reduction.)

Step 2: Identify barriers to mitigation action. (Barriers are defined as obstacles or restrictions that hinder or even prevent the achievement of the intended impacts of the NAMA support project, including market entry barriers, lack of information, lack of capacity, or external costs not internalized in market prices. "Mitigative capacity" projects contribute to the removal of barriers so as to support the partner country in the achievement of GHG reduction.)

Step 3: Have the barriers weighted by (local and/or international) experts. (The significance of the barriers is determined through a survey by experts, going through a pre-prepared survey together with the experts in semis-structured interviews. The experts' survey covers barrier determination, weighting the barriers significance, and quantification of project contribution to overcoming the barriers. The experts will be asked to give a total score out of 100 to each individual barrier according to the barrier's significance. The total ratings of all barriers will equal 100. The ratings of the individual experts will then be summarized as averages.)

Step 4: Calculate according to the weight of a barrier the (potential) GHG reduction through overcoming that barrier. (This step will assess the percentage that the project contributes to overcoming the identified barriers. For each barrier identified in step 2 there is a percentage figure, which shows how much the project contributes to overcoming the individual barriers.)

Source: GIZ 2011: Climate results. The GIZ sourcebook for climate-specific monitoring in the context of international cooperation

Caveat: Emission reductions from NAMAs overcoming barriers differ from emission reductions from immediate actions and investments. They cannot necessarily be aggregated.



International Partnership on Mitigation and MRV

Figure 8 shows basic tier approaches for mitigative capacity improvements and co-benefits. Whether a quantitative assessment is viable, depends on the type of indicator. In some cases, only a semi-quantitative assessment will be viable.

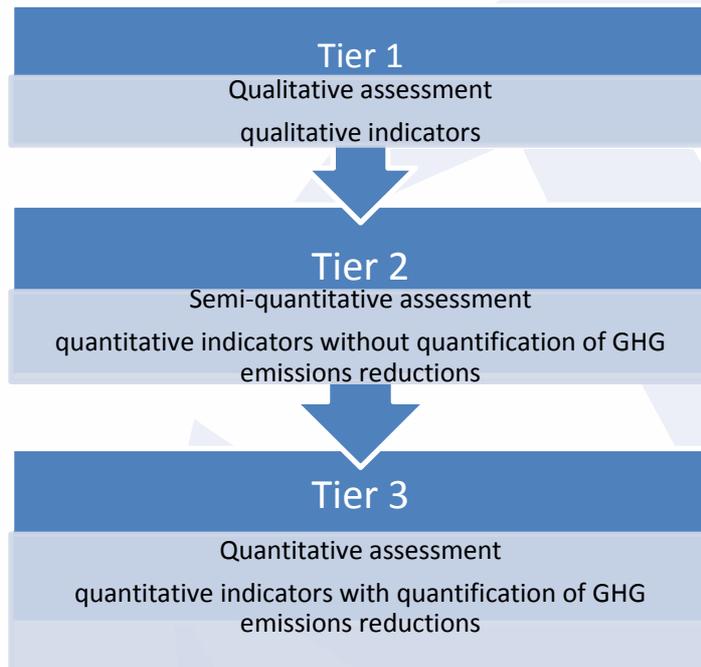


Figure 8 Suggested tier levels for non-emission impacts

Source: Authors

References to selected protocols that can provide additional guidance on existing methods:

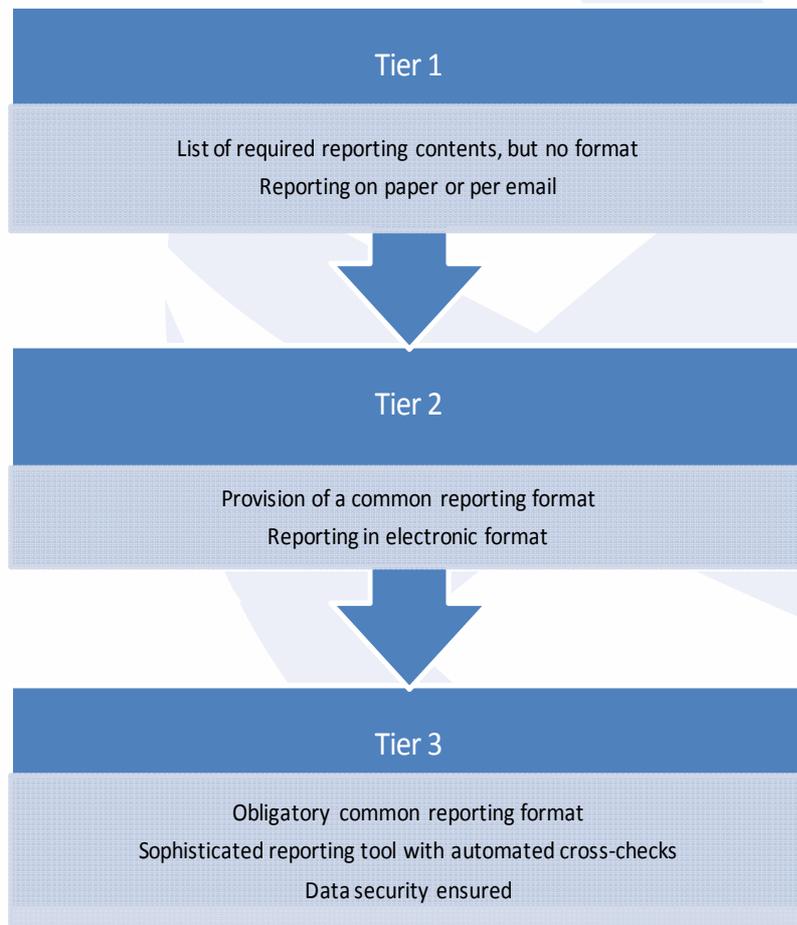
- GHG Protocol Policies and Actions Accounting and Reporting Standard
<http://www.ghgprotocol.org/mitigation-accounting>
- GHG Protocol Mitigation Goals Accounting and Reporting Standard
<http://www.ghgprotocol.org/mitigation-accounting>
- Manual for calculation GHG benefits of GEF projects: Energy efficiency and renewable energy projects: <http://www.thegef.org/gef/node/313>
- Manual for calculating greenhouse gas benefits for global environment facility transportation projects: http://www.thegef.org/gef/GEF_C39_Inf.16_Manual_Greenhouse_Gas_Benefits
- CDM methodologies and CDM Methodology Booklet:
<http://cdm.unfccc.int/methodologies/index.html>



3.3 Reporting approaches

Reporting is the delivery of the measurement results. Within one mechanism there might be several levels of reporting, e.g. company data is reported to an administration at local level, which aggregates the data and reports it to an authority at national level which again reports on the overall mechanism at a national or international level.

Key questions in reporting are a) what is to be reported, b) in which format, c) which institutional set-up can best support these processes, e.g. through data management platforms. When considering what to report, one again has to strike a balance between the effort incurred and the information contained in the report. The monitored indicator values should be included in any case. In order to allow for a review of these values more detailed



data, e.g. activity data and emission factors might be included or even further background data which enables cross-checks of the indicator values. Depending on the mechanism, it might be beneficial to include information supporting exchange of experiences (including experience on barriers and costs) as well as best practices. This seems most appropriate for mechanism-level reporting at the highest level.

Experience shows that using a standardised reporting format offers many advantages. It reduces reporting effort, makes data comparable, supports completeness and enables easier evaluation.

Reporting formats should best

Figure 9 Suggested tier levels for reporting

Source: Authors

be tailored to the capabilities of the entities involved in MRV. There might be situations where electronic reporting formats might not be applicable and paper formats have to be used.



International Partnership on Mitigation and MRV

Wherever this is not the case, electronic formats seem preferable, while not having to be sophisticated: simple Excel-worksheets or web portals might be fully sufficient.

Figure 9 shows suggested tier levels for reporting. The levels mainly differ in standardisation of data required and ease of reporting through using electronic and/or automated formats. What is best practice depends very strongly on the framework conditions within the respective mechanism. Depending on local circumstances, Tier 2 is a good option for many countries to target when developing their initial MRV systems, as it provides a good balance between ease of reporting and ease of evaluation through a standardised template.

As discussed in Section 2, there are a variety of different institutional approaches to gathering data and reporting. What is most appropriate will ultimately depend on the existing organisational structures as well as detail and quality of existing data tracking. Typically, the MRV activities relating to GHG emissions should be integrated into existing data management functions to the extent feasible. There are also different data management platforms that can facilitate these processes. It is important to provide adequate training and protocols for staff, and develop mechanisms to capture institutional knowledge as the staff involved changes over time.

3.4 Verification approaches

Verification as a step in MRV can have many different forms. Its aim is reviewing data and this can cover a broad range of approaches with a simple in-house validation of data using plausibility checks to an auditing exercise by third party technical experts. The form verification takes should be appropriate to the mechanism the MRV is performed for. But the review is not the only function of verification. Verification also plays an important role in facilitating implementation by highlighting areas where no further attention is needed and those in need of improvement. This will assist inter alia in better targeting financial or technical assistance and other gaps.

Independence is a key issue in verification. Whatever the strictness of verification might be, the entity performing the verification should be independent from the entity providing the data to be verified. This is necessary to avoid conflicts of interest.

Another key issue in verification is prioritisation. This is typically done by identifying areas with highest relevance (e.g. largest emission sources) and processes or data with higher risk of error.

Table 1 compares verification activities under the EU Emissions Trading System and for UNFCCC National Inventories of Annex I countries. The approaches are quite different, reflecting the differences in the underlying mechanisms. It is important to note that the



International Partnership on Mitigation and MRV

verification of market-based cap and trade programs and inventories follow different policy objectives. At COP16 in Cancun, Mexico, parties agreed to enhance reporting for Biennial Update Reports (BURs) through International Consultations and Analysis (ICA). The ICA seeks to combine improved reporting with some form of international review in order to increase trust and also facilitate knowledge transfer. The specific form, scope, frequency and processes are still being discussed. Developing countries are particularly interested in a process where the parameters are flexible enough to receive advice while considering national circumstances and preserving national sovereignty and decision-making on policies and internal tracking systems. Some parties also highlight this process as an opportunity for involvement of local experts or experts from developing countries with similar contexts, and at the same time maximizing the technical expertise in the process.



**International Partnership
on Mitigation and MRV**

Table Comparison of established verification approaches for National Inventories under the UNFCCC and under the EU ETS

System	UNFCCC Inventory Review	EU ETS
Who?	A selected team from the UNFCCC roster of experts which have passed the exam for inventory reviewers at the UNFCCC Secretariat.	A verifier accredited under the EU ETS by an authorised accreditation body. This includes regular re-accreditation (roughly every 3-5 years) and review by the accreditation body, which visits the verifier’s office and joins the verifier in site visits.
Basic Approach	<p>The review can take place as</p> <ul style="list-style-type: none"> centralised review with a team of 12 experts covering 3-5 country inventories in one week at the UNFCCC secretariat in Bonn in-country review with 6 experts performing the review at the premises of the authorities responsible for the national inventory. <p>The overall reviews may take up to 1 year, key activities are performed within one week.</p>	The review consists of a strategic analysis of the installation in questions – gaining an understanding of the emission relevant process. As a second step, a risk analysis is performed for the identification of key risks for errors in monitoring and reporting. Based on this, the verifier sets up a verification approach for the installation. This approach includes a visit at the installation – typically half a day is the minimum amount of time spent. The verifier checks reported data against relevant documentation (e.g. invoices, measurements) and interviews staff members, e.g. responsible for quality assurance processes.
When	Review typically starts within 6-9 months after the report has been submitted.	Review in January or February each year
What	Inventory review team identifies underestimation of emissions and further potential for improvement and	Verifier identifies errors in reporting and non-compliance with monitoring requirements. These have to be corrected so



International Partnership on Mitigation and MRV

	<p>encourages or recommends implementation of these points. Any party found to be not complying with reporting requirements must develop a compliance action plan. If emissions of a party are found to have exceeded its assigned amount, it can be declared in non-compliance and required to make up the difference between its emissions and its assigned amount during the second commitment period, plus an additional deduction of 30%. Also, the party may be suspended from the eligibility to make transfers under emissions trading until they are reinstated.</p>	<p>as to at least achieve a materiality level of 2% or 5% defined for the installation depending on the amount of annual emissions.</p>
Risk-based approaches	<p>Focus on key categories</p>	<p>Perform risk analysis for installation and focus on risks identified.</p>
Reporting	<p>The expert review team compiles a review report based on a detailed format provided by the UNFCCC including standard text sections to be adapted.</p>	<p>The verifier writes a report based on a verification template provided by the EU Commission.</p>
Effect of report	<p>Implementation is expected to happen for the same report, where emissions have been found to be underestimated. Further points are expected to be implemented in forthcoming inventory reports. Their implementation will be assessed during forthcoming review rounds. As implementation can take considerable time and reviews are performed every year, this is often not possible between two reviews.</p>	<p>The verifier must be able to state with reasonable assurance that the report is correct. Therefore all errors have to be corrected and non-compliance with monitoring requirements has to be adjusted as much as possible. Where this is not the case, the competent authority will not accept the report, which will typically lead to a fine. Where a report is found to contain errors despite being accepted by the verifier, the verifier can be held liable.</p>



International Partnership on Mitigation and MRV

	<p>Where recommendations have not been implemented without good reasons, they will be reiterated.</p> <p>The party reviewed has the opportunity to respond to the comments of the expert review team. In cases of disagreement, the UNFCCC enforcement branch shall review and determine whether to apply adjustments to inventories.</p>	
Independency	Inventory review team cannot contain experts from the country of which the inventory will be reviewed.	The verifier has to prove independency during accreditation and declares independency within the verification report.
Provisions	UNFCCC guidance on inventory reviews	EU Regulation on verification and accreditation, specific guidance documents by the EU Commission.



International Partnership on Mitigation and MRV

Figure 10 shows suggested tier levels of a tiered framework for verification of mitigation activities at the national level. What is good practice depends strongly on the mechanism for which MRV is performed. For a national mitigation action, a Tier 2 approach might be appropriate, while for an offset-system Tier 3 might be more suitable.

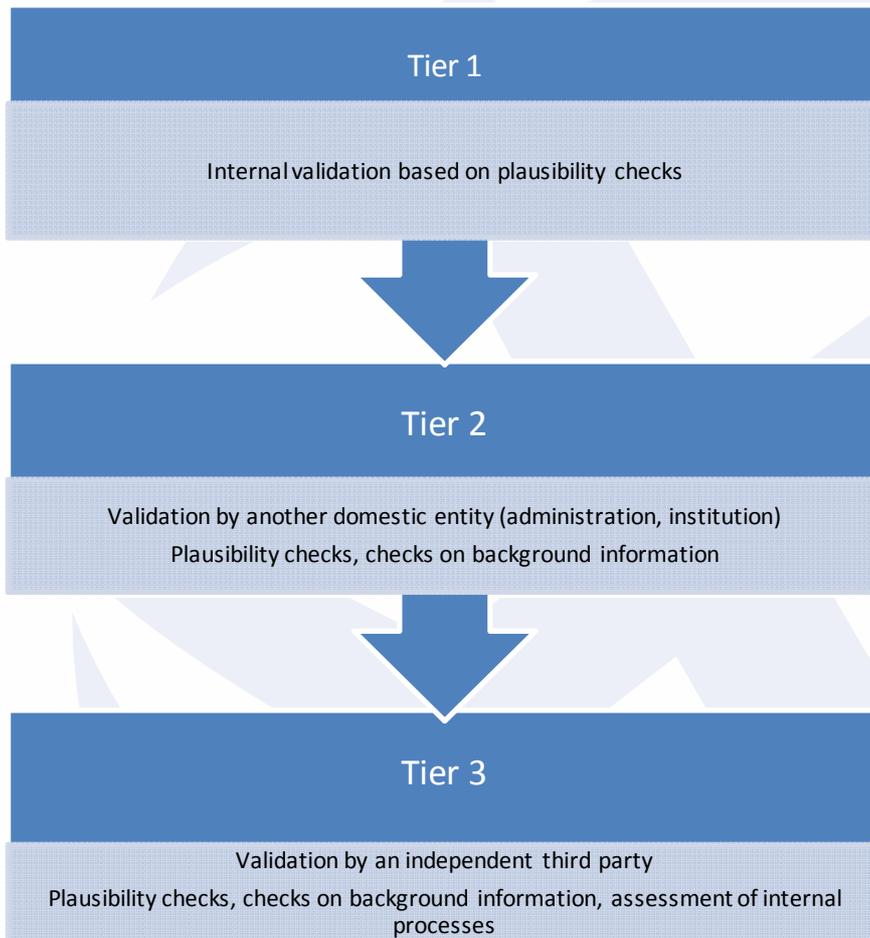


Figure 10 Suggested tier levels of a tiered framework for verification

Source: Authors



4 MRV of public finance

This section is about the tracking of support disbursed to and received by governments of developing countries. As the definition and role of private climate matures, it will be important to develop appropriate MRV systems for private finance as well. Rules for what and how to report in Biennial Reports (BRs) of Annex I countries and Biennial Update Reports (BURs) of Non Annex I countries as mobilized private climate finance accountable to the commitments of Annex I countries to provide support to Non Annex I countries have still not been agreed upon and miss strict definitions.

Monitoring finance differs to a great extent from monitoring GHG emission levels and impacts of mitigation. Nevertheless, the recommendations for monitoring, approaches for indicators setting as well as for reporting and verification as set out in section 4 apply. This dedicated section on MRV of finance aims to highlight a number of specific angles to the issue. Measuring/monitoring the support provided and received is of interest both to donors as well as of the parties receiving support. Various functions of monitoring support exist, including transparency, understanding the extent of support available, assessing the effectiveness of specific instruments for providing support as well as the effectiveness of the support provided.⁵ Annex I parties currently report on the financial support provided to developing countries in their National Communications.

Countries can receive climate finance from many different intermediaries, e.g. unilateral or multilateral banks or agencies, at many different entrance points, e.g. various ministries or institutions. Support can also have many forms, e.g. capacity building, technology transfer, financing instruments, e.g. grants, concessional loans, etc. A common international definition of support, especially with regards to climate finance does not yet exist. This hinders tracking of support both at national and internal level. At the national level tracking of support therefore first requires a set of definitions. Recent reports by the OECD might

⁵ See CPI (October 2011); The landscape of climate finance. The report relates the above named functions only to tracking climate finance. The authors of this document hold the view that these functions can be extended to tracking of support in general.



International Partnership on Mitigation and MRV

provide orientation for this task.⁶ Where Parties join forces in this task in order to develop a set of common definitions, this can enhance comparability and subsequently also effectiveness of tracking support.

At the national level, appointing an administration responsible for tracking support and entitled to receive information on support received and its use can be a step to increase transparency. A clear overview on the amount of support received, its sources and its uses enables more informed decisions related to the need for further funding and potentially more targeted use in the future. Currently each donor has individual reporting requirements which lead to reporting under different formats.

Where funding is monitored and coordinated based on that monitoring, reporting on the amount and use of funding to various donors can also be performed efficiently. Ideally, one institution prepares all reports to donors and aligns them with the institutions who have received the funding. This approach also leads to fewer errors and thus a higher consistency between the reports.

So far, verification approaches for climate finance data have not been defined. The interest of both donors and receivers in monitoring climate finance can support the review of climate finance data, as in theory for each finance flow two datasets should be available. The question remains to be answered how the data from donors supporting a number of countries and countries receiving finance by a number of donors can be easily evaluated for comparison.

Figure 11 below gives an overview of international flows related to climate finance, and illustrates that public funding is just one component of the overall climate finance flows.

⁶ OECD (May 2011): Monitoring and tracking long-term finance to support climate action and OECD (May 2012): Tracking Climate finance: What and how?



International Partnership on Mitigation and MRV

Recommendations from the Autumn School related to MRV of public climate finance

- Appoint one institution to monitor climate finance received and its use
- Provide a clear legal basis for the exchange of information between institutions
- Use the data monitored to decide on future needs and use of climate finance and to improve the effectiveness of its use
- Use your insight on climate finance at national level for negotiations with donors
- Reduce reporting effort by combining reporting activities in one institution



5 Additional Resources

This section includes a compilation of the sources provided in the text above, as well as additional general resources on MRV. As information is always evolving, this list is intended to be representative, but not exhaustive.

Resource Websites with relevant material on a variety of subtopics, only a few of which are repeated here (*frequently updated*):

- Resources available from the International Partnership on Mitigation and MRV:
<http://www.mitigationpartnership.net/resources>
- Resources available from the NAMA Partnership:
[http://www.namapartnership.org/PUBLICATION%20DATABASE/Measuring,%20Reporting%20and%20Verifying%20\(MRV\).aspx](http://www.namapartnership.org/PUBLICATION%20DATABASE/Measuring,%20Reporting%20and%20Verifying%20(MRV).aspx)

References to selected protocols that can provide additional guidance on existing methods:

- Climate Results: The GIZ Sourcebook for climate-specific monitoring in the context of international cooperation (GIZ 2011)
http://starwww.giz.de/starweb/giz/pub/servlet.starweb?path=giz/pub/pfm.web&r=33799&STAR_AppLanguage=0
- GHG Protocol Policies and Actions Accounting and Reporting Standard
<http://www.ghgprotocol.org/mitigation-accounting>
- GHG Protocol Mitigation Goals Accounting and Reporting Standard
<http://www.ghgprotocol.org/mitigation-accounting>
- GHG Protocol Project Protocol and Sector Toolsets:
<http://www.ghgprotocol.org/standards/project-protocol> <http://www.ghgprotocol.org/calculation-tools>
- For sub-national inventories: C40/ICLEI/WRI Global Protocol for Community Emissions
- IPCC 2006 guidelines: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>
- Manual for calculation GHG benefits of GEF projects: Energy efficiency and renewable energy projects: <http://www.thegef.org/gef/node/313>
- Manual for calculating greenhouse gas benefits for global environment facility transportation projects: http://www.thegef.org/gef/GEF_C39_Inf.16_Manual_Greenhouse_Gas_Benefits
- CDM methodologies and CDM Methodology Booklet:
<http://cdm.unfccc.int/methodologies/index.html>



International Partnership on Mitigation and MRV

- WRI: GHG Protocol – Policies and Actions Accounting and Reporting Standard (First Draft in pilot stage, final expected in 2014):

<http://www.wri.org/project/low-carbon-development/measurement-and-performance-tracking/policy-accounting>

Information on accounting for co-benefits:

- CDM Gold Standard: <http://www.cdmgoldstandard.org/>
- Social Carbon Standard: <http://www.socialcarbon.org/>

Information on tracking climate finance:

- Climate Policy Initiative (October 2011); The landscape of climate finance.
<http://climatepolicyinitiative.org/publication/the-landscape-of-climate-finance/>
- The World Bank's internal tracking system for Climate Finance tracks co-benefits at the lowest level of financing information available. The WB published a Typology of Activities with Climate Co-Benefits by WB Sector:
<http://climatechange.worldbank.org/sites/default/files/Typology.pdf>
- The WB is part of the MDB group on mitigation finance tracking. Information on the MDB group approach is at :
http://climatechange.worldbank.org/sites/default/files/MMF_2011_version_21.pdf
- The WB and UNDP are preparing a sourcebook for Climate Public Expenditure and Institutional Reviews through which countries can review current climate expenditures from both domestic and external sources of finance and identify ways in which climate related expenditures can be tracked through time. More information at:
<http://www.aideffectiveness.org/CPEIR>
- OECD (May 2011): Monitoring and tracking long-term finance to support climate action
www.oecd.org/env/cc/48073739.pdf
- OECD (May 2012): Tracking Climate finance: What and how?:
www.oecd.org/env/cc/50293494.pdf