

National planning for GHG mitigation in agriculture:

A guidance document



8

MITIGATION OF CLIMATE CHANGE IN AGRICULTURE SERIES



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Acronyms and glossary of key terms

AAHB	Agriculture and Animal Husbandry Bureau (China)
ASCU	Agricultural Sector Coordination Unit (Kenya)
BAU	Business-as-usual (activities and GHG emissions that would happen if there is no mitigation policy or measure)
CCAFS	Climate Change, Agriculture and Food Security program of the CGIAR
CDM	Clean Development Mechanism
CO₂eq	Carbon dioxide equivalent
CSA	climate-smart agriculture
DFID	Department for International Development (United Kingdom)
DRSRS	Department of Resource Surveys and Remote Sensing (Kenya)
FAO	Food and Agriculture Organization of the United Nations
EDPRS	Economic Development and Poverty Reduction Strategy (Rwanda)
FYR Macedonia	The Former Yugoslav Republic of Macedonia
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate change
LCDS	Low-Carbon Development Strategy (Guyana)
LEDs	Low-emission development strategies
M of A	Ministry of Agriculture (Kenya)
MRV	Measurement, reporting and verification
Mt	Megatonnes (million tonnes)
N₂O	Nitrous oxide
NAMA	Nationally Appropriate Mitigation Action
NAPCC	National Action Programme on Climate Change (Mongolia)
NCCAP	National Climate Change Action Plan (Kenya)
NDS	National development strategy
NGOs	Non-governmental organizations
NIMES	National Integrated Monitoring and Evaluation System (Kenya)
NLP	National Livestock Programme (Mongolia)
NPBMF	National Performance and Benefit Measurement Framework (Kenya)
NPV	Net present value
R&D	Research and development
REDD+	Reducing Emissions from Deforestation and Forest Degradation (including enhancement of forest carbon stocks)
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar
Annex 1 countries	OECD countries and economies in transition that are signatory to Annex 1 of the UNFCCC which commits them to emission reductions
Non-Annex 1 countries	Developing countries that are not signatory to Annex 1 of the UNFCCC

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About this guide

A significant proportion of developing countries have expressed an interest in greenhouse gas (GHG) mitigation in the agriculture sector. However, compared to mitigation planning in some other sectors, progress with developing agricultural mitigation plans and the allocation of climate finance to the agriculture sector have been limited. The purpose of this guide is to provide national policy makers, advisors and other stakeholders in the agriculture sector with an introduction to the main mitigation planning approaches and the key elements that may need to be considered in the planning process.

This guide describes two of the main approaches to GHG mitigation planning in developing countries: Low-Emission Development Strategies (LEDS) and Nationally Appropriate Mitigation Actions (NAMAs). It explains the possible relationships between them and their status within the United Nations Framework Convention on Climate Change (UNFCCC). National mitigation planning processes have policy, technical and institutional dimensions that need to be addressed in an integrated and iterative manner. For each of these dimensions four key elements are outlined. Examples from mitigation planning processes in developing countries are provided to illustrate the range of options for addressing these key elements in country-specific ways. Special considerations for including smallholder farmers in the planning process are highlighted.

This guide may be read as a companion document to the recent publication, *National integrated mitigation planning in agriculture: A review paper*, which reviewed LEDS in 18 developing countries and agricultural NAMAs in 30 countries. The Review Paper, prepared with support of CCAFS and FAO, can be accessed here: <http://www.fao.org/docrep/017/i3237e/i3237e.pdf>.

Introduction

Agriculture makes key contributions to rural development. It ensures food security, generates employment and delivers a range of other social and environmental services that are critical to sustainable development (FAOa, 2012). Currently 870 million people, mostly in developing countries, remain chronically undernourished (FAOb, 2012). In a world in which the global demand for food and food security is increasing, there are concerns about the impacts of climate change on future food production and availability (Beddington *et al.*, 2012; FAO, 2009). Agriculture is also a source of GHGs that drive climate change. In 2005, it contributed an estimated 10-12 percent of global emissions (IPCC, 2007). This figure does not include the contributions food production makes to emissions in other sectors, such as energy or transport. Agriculture is a driver of deforestation and other land use changes that are responsible for a further estimated 17 percent of total global emissions (IPCC, 2007).

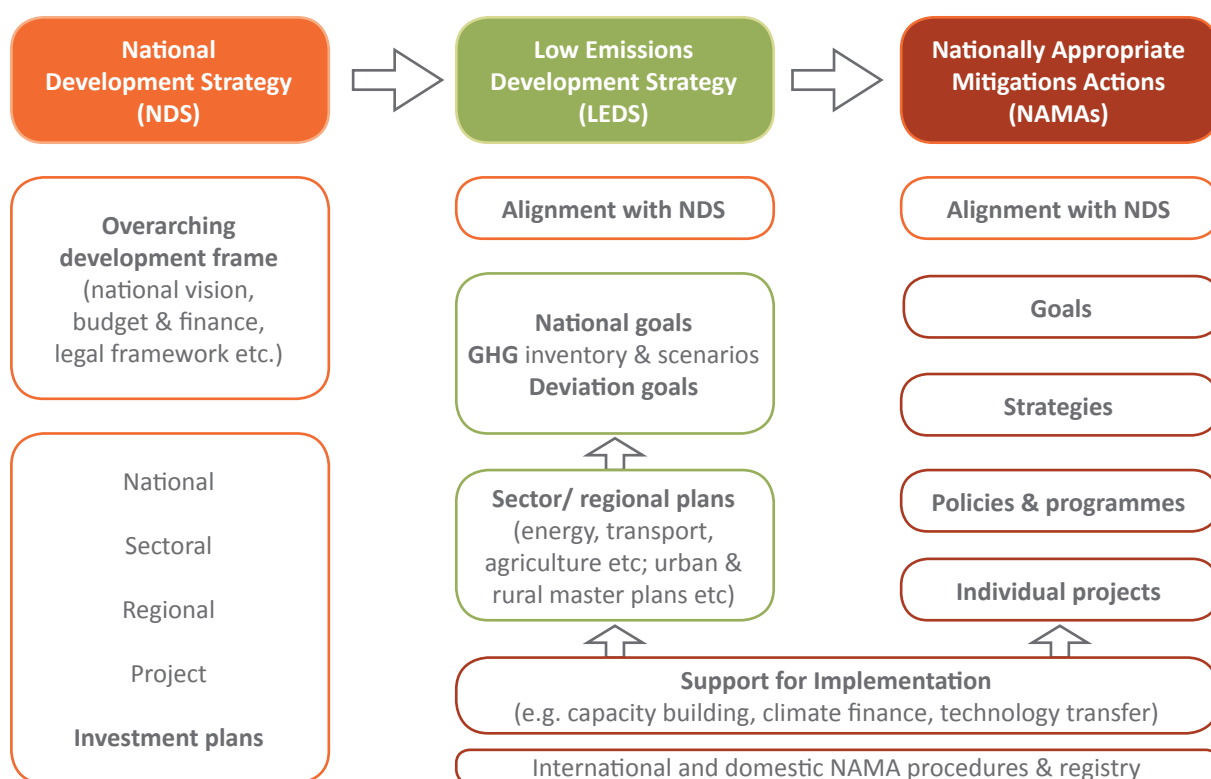
For many developing countries, the primary concerns regarding agriculture relate to food security, economic development and adaptation to the impacts of climate change. However, a significant proportion of developing countries have expressed interest in GHG mitigation in the agriculture sector. Two-thirds of developing country low-emission development plans address mitigation in agriculture (Wilkes, Tennigkeit and Solymosi, 2013). In 2010, 15 of the first 35 countries submitting NAMAs to the UNFCCC specified actions in the agriculture sector (FAO, 2010). In developing countries, agriculture and forestry is the second most common sector for GHG mitigation technology needs (UNFCCC, 2009). The contribution of agriculture as a driver of deforestation is also increasingly being acknowledged (Boucher *et al.*, 2011; Kissinger, Herold and De Sy, 2012). Reasons for prioritizing mitigation in the agriculture sector vary depending on national circumstances. Besides GHG mitigation potential, these reasons include: the contribution of mitigation practices to food security; increased efficiency and trade competitiveness; synergies with adaptation to climate change; and synergies with policies to address drivers of deforestation and non-point pollution of water sources (Wilkes, Tennigkeit and Solymosi, 2013).

Despite the widespread interest in GHG mitigation in the agriculture sector, agriculture has received little explicit attention in the UNFCCC process, and progress in implementing mitigation actions in the agriculture sector has been slow. Of 34 NAMAs in the agriculture sector that have been communicated to the UNFCCC, only four have been developed beyond the general concept outlined in the initial communication (Wilkes, Tennigkeit and Solymosi, 2013). A very small proportion of climate finance has been allocated to the agriculture sector (Hodas, 2012). In addition to general constraints on mitigation planning faced by many developing countries, the agriculture sector must deal with a number of particular constraints. These include: limited awareness among domestic politicians and officials as well as the staff of climate finance institutions of the relevance of GHG mitigation to the agriculture sector and the relevance of specific mechanisms, such as LEDS and NAMAs, to agriculture; limited national research capacities; and the presence of a range of barriers to adoption that are encountered by smallholder farmers (Wilkes, Tennigkeit and Solymosi, 2013).

International and national contexts for mitigation planning

The UNFCCC provides the international framework for GHG mitigation planning. Developing countries are not obliged under the UNFCCC to implement mitigation actions. They are, however, encouraged to implement mitigation actions in the context of sustainable development supported by technology, financing and capacity building (UNFCCC, 2007). Developed country Parties to the UNFCCC have committed themselves to provide long-term funds, up to USD 100 billion per year by 2020, for mitigation activities (UNFCCC, 2010). These commitments provide an essential basis for creating incentives, enabling planning and scaling up implementation for mitigation actions in developing countries.

Box 1: Relationship between national development plans, LEDS and NAMAs



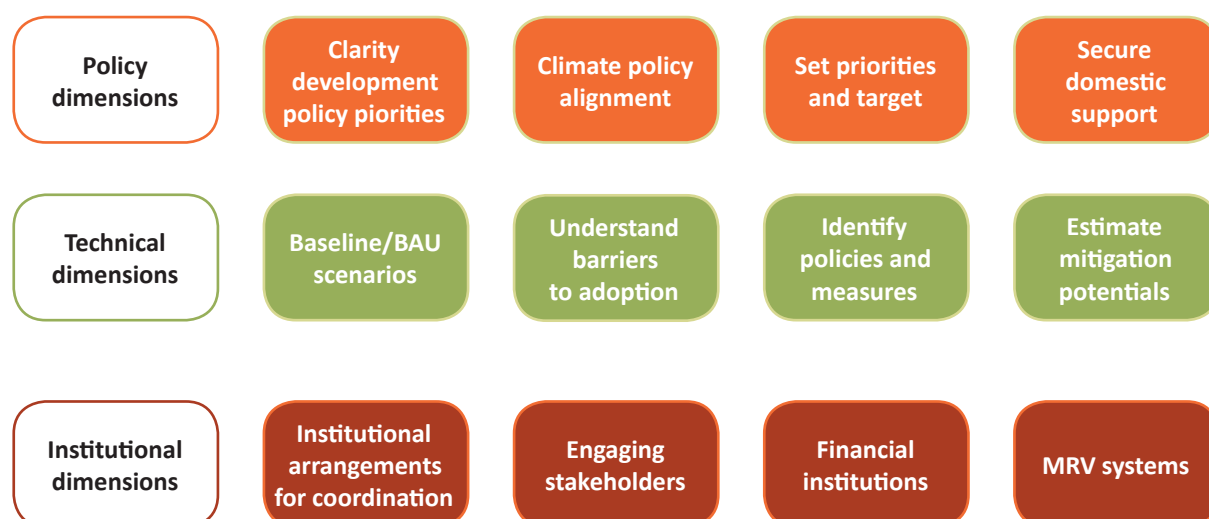
Source: (Adapted from UNEP, 2012)

There are two main types of planning instrument for national mitigation planning: low-emission development strategies (LEDS) and nationally appropriate mitigation actions (NAMAs) (see Box 1). LEDS are national, regional or sectoral strategies and plans that aim to guide a transition to a low-emission development pathway. There are two types of LEDS planning document: LEDS framework plans and LEDS action plans. LEDS framework plans generally identify priority sectors for mitigation policies and actions on the basis of national conditions, existing national development policy frameworks and analyse of baseline GHG emissions by sector. These framework plans outline principles and institutional arrangements for the development of action plans to implement the strategy. LEDS action plans specify the policies and measures through which the strategy will be implemented. Through analyses of national and sectoral GHG inventories, LEDS action plans may also provide quantified targets or estimates of the deviation in GHG emissions between a baseline (or business-as-usual) emissions pathway and a proposed low-emission pathway. Rather than setting new priorities, LEDS are generally oriented around existing long-term national, sectoral or regional development plans, and are a key tool for mainstreaming low-emission planning in these plans.

NAMAs are mitigation actions undertaken to support national sustainable development. Since NAMAs are to be defined in nationally appropriate ways, there is no strict guidance on what constitutes a NAMA. A NAMA may be a national or sectoral goal, a strategy, a national or sectoral programme, or a project-level action. The UNFCCC distinguishes between NAMAs that are to be implemented with international support and domestically supported NAMAs. Both types of NAMA may be registered with the UNFCCC. Registration may be done either to seek international support or obtain international recognition for the unilaterally implemented mitigation action.

NAMAs may be elaborated independently of a LEDS; a LEDS may form the strategic context for the identification of NAMAs; or developing a LEDS may itself be a NAMA. Since mitigation actions of developing countries should be undertaken with a view toward sustainable development, both LEDS and NAMAs should support the implementation of national development strategies.

Box 2: Key elements in the mitigation planning process



Source: Wilkes, Tennigkeit and Solymosi, 2013

There is no standardized process that must be followed to make progress in mitigation planning in the agriculture sector. The planning process can be thought of as consisting of a number of key elements, or 'building blocks'. Each building block corresponds to the enabling conditions and the technical procedures that may be required to elaborate a mitigation plan (Box 2). There will be interactions between several of these key elements. The planning process will need to address these interactions iteratively and consider the assessment of one key element on the basis of the results relating to other key elements. The current status of each of these elements will differ between countries. Different countries may assign different priorities to these various elements. The planning process should therefore address key elements in country-specific ways. It will often be appropriate to devise the mitigation planning process in a phased approach, which will enable a country to address gaps and needs incrementally, rather than attempting to put all key elements in place before producing a planning document. The remainder of this document elaborates on these building blocks and provides examples from mitigation planning processes in developing countries with a focus on mitigation planning in the agriculture sector.

Policy dimensions of national mitigation planning

Policy
dimensions

Clarity
development
policy priorities

Climate policy
alignment

Set priorities
and target

Secure
domestic
support

National mitigation plans, whether LEDS or NAMAs, should be aligned with and support the implementation of national development strategies. In most countries, these strategies are outlined in long- or medium-term development plans that have been approved through politically mandated processes. Multisectoral national climate change strategies set out the priorities for climate change mitigation and adaptation. Mitigation planning in the agriculture sector should ensure that mitigation policies and measures support the achievement of existing policy priorities outlined in these documents. Technical analyses can contribute to identifying potential subsectors, effective policies and measures, and their technical mitigation potentials. Priority setting, on the other hand, is a political task. Securing a mandate for planning and involving stakeholders (e.g. farmers' organizations) in the priority setting process will be necessary to garner support for the planning process and for the subsequent implementation of the planned mitigation policies and measures.

Clarity
development
policy priorities

How can agricultural mitigation actions contribute to achieving national development objectives? GHG mitigation in the agriculture sector should be pursued in the context of national sustainable development. Policy priorities and objectives are outlined in national and sectoral development plans that have been approved through politically mandated processes. Agricultural mitigation

plans should therefore support implementation of these plans. Agriculture relates to many aspects of national policy, such as food security, trade competitiveness, rural employment, poverty alleviation and natural resources management. Mitigation actions in the agriculture sector may involve trade-offs with other policy objectives. It is necessary to clarify the policy priorities to which mitigation policies and measures in the agriculture sector should contribute.

How have countries linked agricultural mitigation plans to development priorities? There are three general approaches through which developing countries have clarified the relationship between mitigation in the agriculture sector and national development policy priorities:

- setting principles for national mitigation planning in all sectors;
- screening agricultural mitigation options against national development strategy documents; and
- identifying mitigation options within existing national agricultural development programmes that are already aligned with national development priorities.

Setting principles: One function of framework LEDS documents is to outline the principles on which national mitigation strategies will be based. For example, South Africa's framework plan on climate change mandates the "prioritisation of mitigation interventions that have potential positive job creation, poverty alleviation and/or general economic impacts" (Republic of South Africa, 2010). The climate change framework plan of the Philippines identifies adaptation to climate change as the national priority and states as a principle that mitigation actions shall be pursued where they contribute to adaptation (Climate Change Commission of the Philippines, 2010).

Screening against development plans: In other countries, the priorities and objectives listed in existing development strategy documents are taken as a criterion for screening mitigation options in the agriculture sector. For example, in preparing Ethiopia's Climate-Resilient Green Economy Strategy, a long list of mitigation options was compiled. But only options that make a positive contribution to the targets of the national Growth and Transformation Plan, the country's medium-term planning document, were considered (Federal Democratic Republic of Ethiopia, 2011).

Build on existing programmes: Another approach has been to look at existing national agricultural programmes that are already aligned with national development policies and identify mitigation options within these programmes (see Box 5). This approach provides continuity with existing policies, but it may only bring about significant change if the existing programmes are both realistic and ambitious.

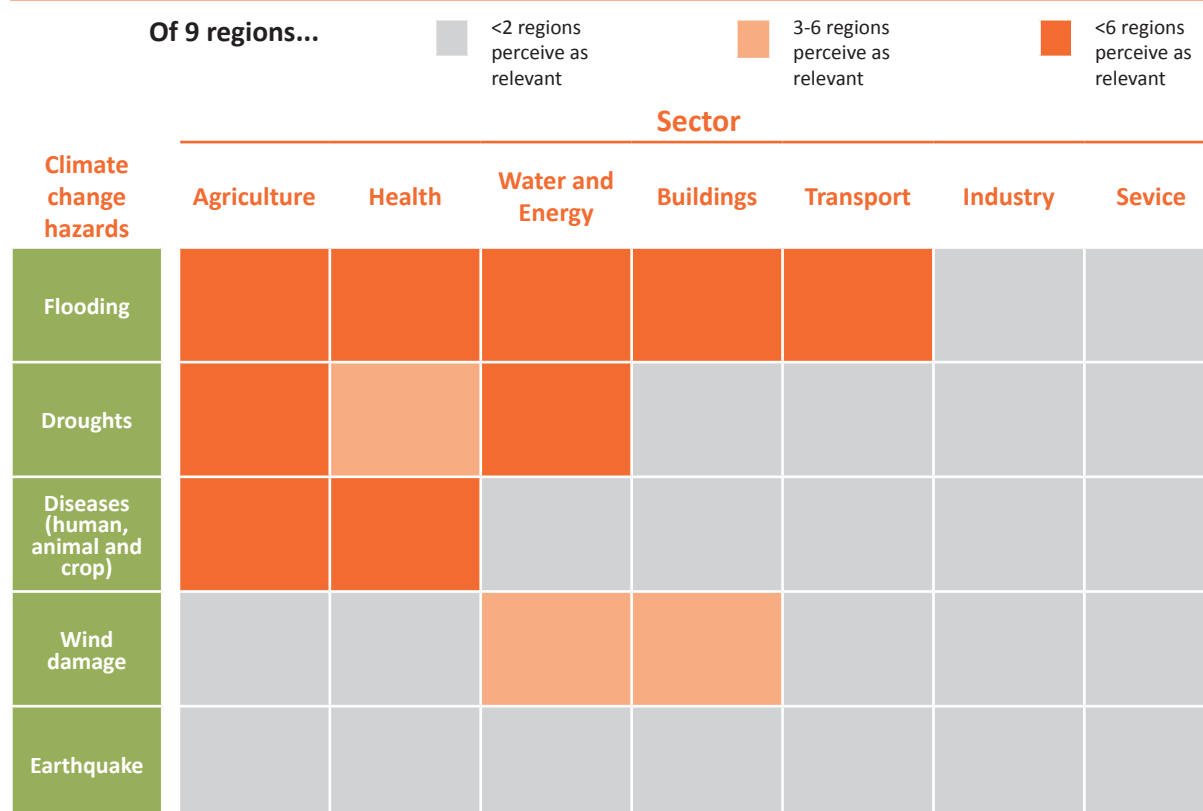
In following these different approaches, countries have given various reasons for paying attention to GHG mitigation in agriculture. These reasons include the synergies agricultural mitigation has with sectoral objectives for:

- increasing efficiency and trade competitiveness (e.g. Brazil's Agro-Energy Plan) (Ministry of Agriculture, Livestock and Food Supply, 2006);
- addressing agriculture as a driver of deforestation (e.g. agricultural support programmes in forest frontier areas of Mexico) (Mexico National Forestry Commission, 2010);
- promoting access to energy in rural areas (e.g. biogas extension in Cambodia's National Green Growth Roadmap) (Kingdom of Cambodia, 2009);
- fostering food security (e.g. cropland nutrient management in Ethiopia's Green Economy Strategy) (Federal Democratic Republic of Ethiopia, 2011); and
- reducing agriculture's contribution to non-point pollution of water sources (e.g. nutrient management programmes in China) (Ministry of Agriculture of the People's Republic of China, 2011).

Mitigation actions in the agriculture sector can potentially contribute to many sectoral and national development objectives.

As with climate change mitigation, adaptation to climate change is an emerging policy domain in many countries. Some of the existing LEDS and proposed NAMAs note the synergy between proposed mitigation and adaptation actions in agriculture. However, very few have explicitly analysed how mitigation and adaptation are related. An exception is the planning processes carried out in Ethiopia, which have addressed both adaptation needs at the regional level and mitigation options at the national level (see Box 3). Policies and measures that increase smallholder farmers' resilience to climate variability and climate change, and that are robust enough to cope with different climate risks will reduce climate-related losses and ensure that GHG mitigation efforts deliver benefits under different climate scenarios.

Box 3: Identifying sectors most vulnerable to climate change



Source: Federal Democratic Republic of Ethiopia, 2011

Climate policy alignment

How can agricultural mitigation actions contribute to achieving national climate policy objectives? Mitigation planning in the agriculture sector is often undertaken after a national climate change strategy has been elaborated through multisector stakeholder consultation processes. Agricultural mitigation plans should reflect the priorities of the national climate change mitigation strategy. In most countries, the development of the national climate change strategy has been led by the environment ministry. Alignment of agricultural mitigation plans with national climate change strategies and policies can help garner cross-sectoral support within the government and among other stakeholders. Since environment, planning or finance ministries are often the focal points for international support for climate change mitigation, ensuring an alignment between plans and policies between these sectors and the agriculture sector can be important for securing national and international support for agricultural mitigation plans.

How have countries ensured an alignment between agricultural mitigation and climate change policies? Mitigation planning in the agriculture sector often proceeds after priorities for national mitigation planning have been identified. The national strategy gives a mandate to agencies in the agriculture sector to initiate sectoral planning. Box 4 gives an example of how an existing agricultural programme was selected as the basis for a NAMA, which has ensured that the NAMA is aligned with both development and climate policy priorities. Often, agricultural agencies may be less familiar with climate change mitigation than is the case with agencies in other sectors. In addition, in many countries climate change mitigation policy is undergoing rapid change as developments in different sectors and interactions with international actors modify the range of available opportunities. Interministerial committees, steering groups, or (as in the case in Box 4) joint working groups between environment and agriculture ministries, can help to maintain policy alignment and coordination between plans and policies in different sectors. A number of countries are now establishing climate change units within agricultural ministries and other line ministries to mainstream climate change concerns in each sector, link national strategies to sectoral plans and enhance coordination between sectors.

Box 4: Policy alignment of a grassland and agriculture NAMA in Mongolia

The Parliament of Mongolia approved the National Action Programme on Climate Change (NAPCC) in 2011. It is aligned with the Millennium Development Goals-based Comprehensive National Development Strategy of Mongolia (2008). The NAPCC includes climate change adaptation and mitigation measures. Its main objectives are to ensure ecological balance; develop socio-economic sectors to reduce vulnerabilities and risks; mitigate GHGs; promote economic effectiveness and efficiency; and implement 'Green Growth' policies.

Within the NAPCC's framework, a grassland and agriculture NAMA is currently being developed jointly by the Ministry of Environment and Green Growth and the Ministry of Industry and Agriculture. The NAMA will be integrated into the National Livestock Programme (NLP), a nationwide programme with substantial domestic funding. The NLP was deemed to be a suitable programmatic framework for a NAMA because:

- the NLP has been approved by Parliament, which is an indication of formal political support;
- the NLP is closely aligned with the national development strategy and national policies on food security and herders; and
- the NLP provides support to reduce the vulnerability of herders and grassland to climate change, and improve productivity to reduce the GHG intensity of livestock production, and is consequently aligned with several objectives of the NAPCC.

Through the NLP, the specific actions of the NAMA would provide assistance to herders to address animal health, livestock productivity and livestock marketing constraints. This would support a gradual shift from extensive, risk-prone grazing systems to semi-intensive, more remunerative management systems. It would also increase herders' resilience to climate risks and provide incentives for good land stewardship.

Source: Ministry of Environment and Green Development, 2011

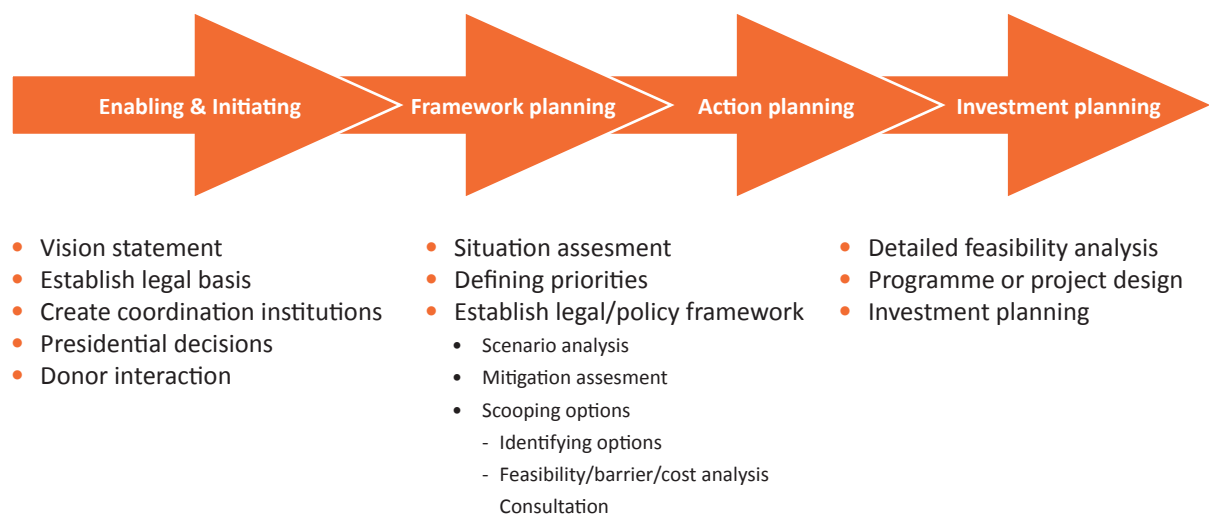
Set priorities and target

What are the priority objectives, actions and realistic targets for the agricultural mitigation plan? Priorities and targets for mitigation plans are generally set on the basis of a combination of existing policy frameworks, technical analyses of mitigation options and stakeholder consultations. Involving farmers and other industry stakeholders in setting priorities is essential to generate support for the planning process and ensure

that planned policies and measures are realistic and likely to be effective. These components are described in other sections of this guide.

For most countries, it cannot be expected that detailed investment plans will result from a single planning phase. Agricultural mitigation planning should be seen as a process of gradually putting key enabling and technical elements into place (see Box 5). As planning documents are elaborated at each stage of the planning process, priorities and targets are set in light of the state of readiness. Focus should be placed on key actions and enabling conditions that would allow for continued progress in mitigation planning at a later stage.

Box 5: Stylized mitigation planning process

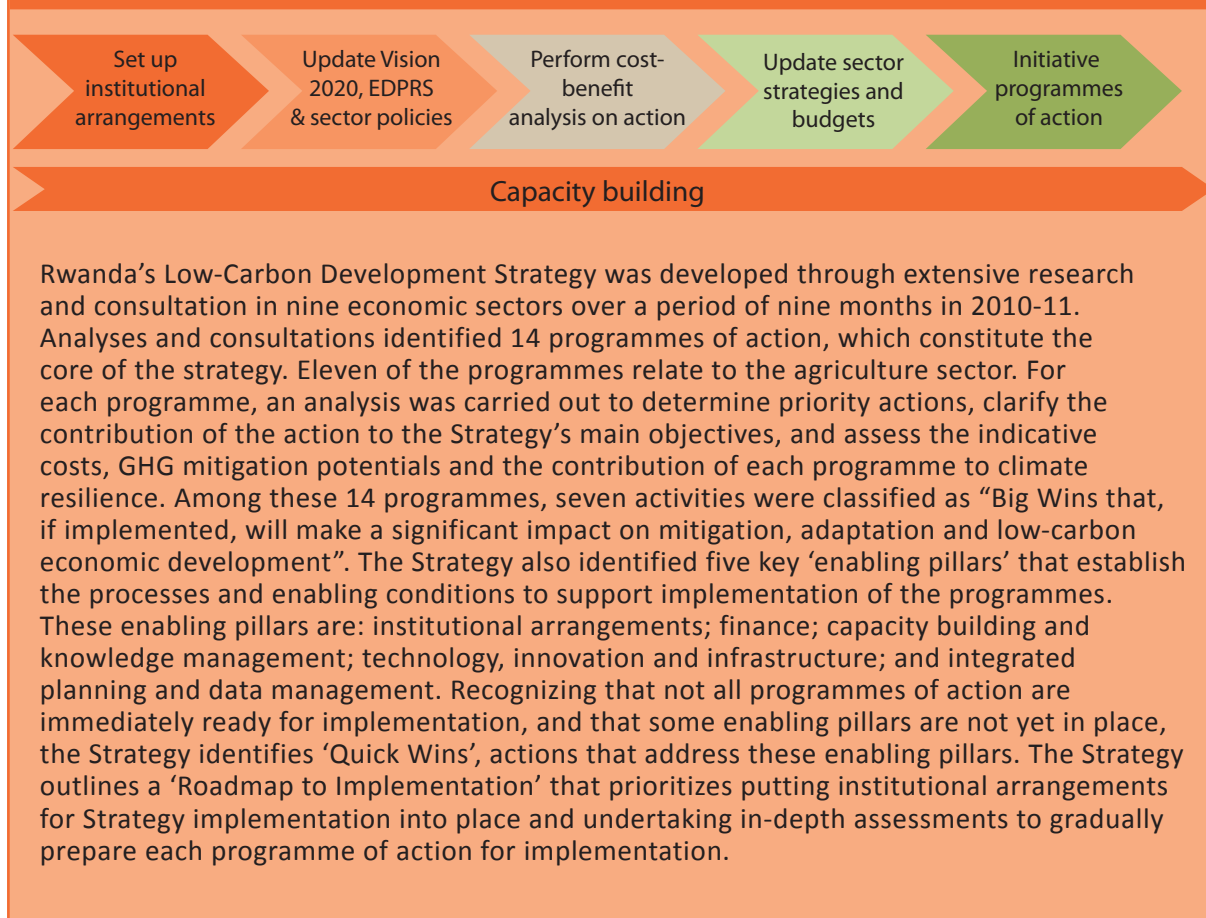


Source: Wilkes, Tennigkeit and Solymosi, 2013

How have countries approached priority and target setting? Some countries have set targets for GHG mitigation in the agriculture sector based on sectoral analyses, and subsequently devised programmes of action to meet these targets. For example, Brazil's NAMA communications to the UNFCCC in 2010 listed four specific agricultural NAMAs (restoration of grazing land, integrated crop-livestock systems, no-till farming and biological nitrogen fixation) and estimated the range of mitigation potential of each. These activities were then included in a sectoral plan for agricultural mitigation, known as 'Plano ABC'. This plan has been approved and implementation has begun. Research to quantify the activity's mitigation benefits is being carried out in parallel with implementation (Office of the President of the Republic of Brazil, 2011; Barioni, 2012).

However, it is more common for mitigation plans to be developed through a phased approach. For example, at the national level, the Philippines and South Africa both began by developing a framework strategy for climate change that set out the main policy, institutional and technical requirements for developing a national action plan (Republic of South Africa, 2010; Climate Change Commission of the Philippines, 2010). China and Indonesia also prepared climate change strategies in their medium-term planning documents and followed up with sectoral climate change plans, which are now being translated into subnational agricultural development plans. A number of LEDS have also been specific about the progress and the limitations in the planning process, which has enabled the plans to highlight the key actions required to maintain momentum in the planning process. Box 6 presents an example from Rwanda's National Strategy for Climate Change and Low-Carbon Development

Box 6: Roadmap to implementation of Rwanda's Low-Carbon Development Strategy



Source: Republic of Rwanda, 2011

Similar to the example from Rwanda's LEDS, some NAMAs in the agriculture sector have been conceived as a step-by-step process that gradually moves towards readiness for implementation. On the basis of an extensive assessment, Mongolia's livestock and agriculture NAMA, for example, identifies three categories of action that constitute the NAMA: actions that can be done in a relatively short timeframe with limited resources and help put key NAMA building blocks in place; actions prioritized because they would enable a number of key elements to be put in place, but whose implementation would require dedicated domestic or international resources; and medium-term actions that address building the national framework to support NAMAs across multiple sectors once practical experience in individual sectors has been gained (Asian Development Bank, 2013). Uruguay's agriculture-energy NAMA also proposes a step-by-step process that addresses policy frameworks, feasibility analysis, applied research and demonstration activities (UNFCCC, 2012).

Analyses based on abundant, good quality data on emissions and costs can be of great benefit in setting priorities and targets in the planning process. However, developing countries often lack reliable country-specific data on many aspects of agricultural production, and data sharing among national institutions is often an issue (Clapp, Briner and Karousakis, 2010). For this reason, mitigation plans often propose additional data collection, analysis and modeling activities, in an effort to gradually improve the basis for technical analysis of mitigation options. In practice, however, LEDS and outlines for NAMA proposals are not only driven by data availability, since priorities can be decided on the basis of policy frameworks and stakeholder consultation. In addition, several international data sources are available to fill national data gaps in ways that are

sufficient to determine the overall directions of future planning and action. Existing data sources include the Tier 1 default factors for GHG emissions provided in the Intergovernmental Panel on Climate Change (IPCC) GHG inventory guidelines and activity data from national statistics or other sources, such as FAOSTAT, which now provides Tier 1 estimates of historical emissions for agriculture and land use activities. Data required for technical analysis can be generated over time and in relation to the specific needs of the plan, and stakeholders, (e.g. farmers' organizations) can contribute to setting priorities and targets in each successive phase. These are two of the significant potential benefits of a phased approach to developing mitigation plans, policies and measures.

Secure domestic support

Support from which stakeholders will be critical to success of the planning process? Support from a range of domestic stakeholders is required to initiate, implement and follow-up on a national mitigation planning process. Leadership, cross-government involvement and stakeholder support are critical to developing a well-informed plan for implementation (Clapp, Briner and Karousakis, 2010).

In some countries, garnering support has also required a legal mandate for mitigation planning. Involving farmers' organizations and other industry associations throughout the planning process may ensure their buy-in to the planning process.

How have countries secured domestic support for agricultural mitigation planning? Approaches to securing domestic support for a mitigation planning process depend greatly on national circumstances. In some countries, such as Brazil, the Philippines and the Republic of Korea, (Philippines Republic Act 9729 (2009); Brazil Federal Decree 7,390/2010; Republic of Korea Framework Act on Low Carbon Green Growth) initiating mitigation planning has required a legal mandate for planning and the uptake of the resulting plan. This mandate, through legal acts or government decrees, legitimizes the plans, clarifies institutional responsibilities in the planning process and provides a legal basis for sectoral and regional government agencies to translate national plans into mitigation plans in their respective domain. In several countries, mitigation planning processes are led by the office of the head of state. Involvement of ministerial agencies in charge of planning and ministries of finance provides strong support for the planning process. Involvement of finance and environment ministries and mechanisms for coordination with other sectoral agencies may be important for securing cross-government support for an agricultural mitigation plan.

National climate change strategies also need to consider the modalities for translating national plans into subnational government plans (see for example BAPPENAS, 2012; and reports analysing legislative implications of Kenya's National Climate Change Action Plan available at http://kccap.info/index.php?option=com_phocadownload&view=category&id=32). Legislation may be required to enable subnational governments to include GHG mitigation planning in their local development plans. Where national plans specify emission reduction targets, consideration should be given to whether the plans to achieve those targets are to be achieved through bottom-up aggregation of local level plans or through top-down allocation of tasks. Furthermore, experience from several countries indicates that significant capacity building may be required to enable subnational governments to develop local mitigation plans.

The involvement of a broad range of sectoral stakeholders, including farmers' organizations, is also important for generating support. The technical dimensions of mitigation planning may require individuals and institutions from several sectors to share data and participate in the analysis. Through consultations with a range of stakeholders, the planning process can draw on diverse insights and perspectives, allow a range of opinions to be heard and enable those affected by the plan to have an opportunity both to understand the proposals and to provide feedback. Regional consultations can also ensure that the plan considers regional diversity within a country or sector. Box 7 describes a consultation process in the Guyana's Low-Carbon Development Strategy. The quality of the consultation process was monitored by independent consultants to ensure that high standards were met.

Box 7: Nationwide consultation on Guyana's Low-Carbon Development Strategy

To ensure that Guyana's Low-Carbon Development Strategy (LCDS) planning process met internationally accepted standards, the President of Guyana requested technical advice on and independent monitoring of the stakeholder consultation process. A concept for the consultation process was developed based on nine commonly recognized principles for effective and meaningful consultation: transparency, inclusivity, information, timeliness, representation, flexibility, clarity, accountability and continuity. The general approach was to encourage broad-based participation and allow for self-mobilization by stakeholder groups in reviewing a draft document and making inputs to the LCDS.

Initial awareness raising events, organized by the Climate Change Secretariat within the Office of the President, introduced the LCDS at national and subnational meetings. Preliminary stakeholder feedback, criticisms and recommendations from these meetings were analysed and used to agree on follow-up discussions with the meeting's participants. These follow-up sessions, organized by the major stakeholder groups and NGOs themselves, helped stakeholders to elaborate their positions and perspectives. After these sessions, written submissions were made to the Office of Climate Change for potential uptake into a revised LCDS where consensus was reached. Where no consensus could be reached, the plan was to record these views on an "agree to disagree" basis.

A drafting committee was established to capture all the comments received and to revise the LCDS based on submissions from stakeholder groups. To ensure that stakeholder opinions had been captured, detailed records of stakeholder meetings, including video records, were made. A debate in Parliament was also scheduled. Special provisions were made for consultations with indigenous peoples.

The process was monitored by a team of international experts, who assessed the process against the nine principles outlined in the consultation proposal document. Their report verified aspects that had been performed well and made recommendations for improvements in terms of process and specific stakeholder issues that many not have been fully addressed.

Source: Dow, Radzik and MacQueen, 2009

Box 8: Considering smallholders in policy dimensions of mitigation planning

Addressing farmers' priority concerns: For most farmers in many countries, mitigation of climate change is not their primary concern. They are more directly concerned with meeting shorter-term needs related to food security, income or profitability, and with longer-term prospects for their families and business. Mitigation of climate change can have synergies with these objectives. Agricultural mitigation plans that directly help farmers to address their primary concerns may have a higher chance of success. Involving farmers and organizations representing farmers' interests in the planning process can help align mitigation planning with farmers' priority concerns.

Equity considerations: Many countries are promoting agricultural modernization. This often includes the commercialization of agriculture as a means of increasing the sector's contribution to economic growth, rural employment and income generation. In some situations, the adoption of mitigation practices is more feasible for large-scale, commercial operations. This raises concerns about the distributional impacts of schemes to provide subsidies and incentives to support GHG mitigation.

Addressing diversity among farmers: Farmers' interests in particular practices and their potential to adopt them may depend on their existing endowments of resources and other attributes. This will vary greatly among farmers. Policies and measures may aim to target particular types of farmer, but the specific characteristics of individual farmers (e.g. wealth levels, gender, ethnicity, age) may limit their ability to adopt and benefit from the promoted practices. Poorly designed or implemented programmes may even increase inequality of opportunity and outcomes among farmers.

Technical dimensions of national mitigation planning

Technical dimensions

Baseline/BAU scenarios

Understand barriers to adoption

Identify policies and measures

Estimate mitigation potentials

Mitigation policies and measures in the agriculture sector that are designed to support stakeholders in the sector to adopt management practices that result in lower GHG emissions are also intended to deliver other benefits for national sustainable development. Understanding historical or business-as-usual GHG emissions is an essential step in identifying agricultural subsectors, policies and measures that have significant GHG mitigation potential. This may also be necessary to justify domestic or international investment in agricultural climate change mitigation. However, changes in management practices in the agriculture sector, unlike some other economic sectors, are often influenced by many factors other than policies and investments. Understanding barriers to adoption of mitigation practices by farmers, and designing policies and measures to effectively address these barriers are critical elements in the design of feasible and effective mitigation actions in the agriculture sector. In practice, few agricultural mitigation plans have incorporated in-depth assessments of barriers to adoption into the planning process. These plans are mostly at an early stage of identifying possible options and estimating the mitigation potentials of generic technical options. They have not yet specified policies and measures to deliver these potentials.

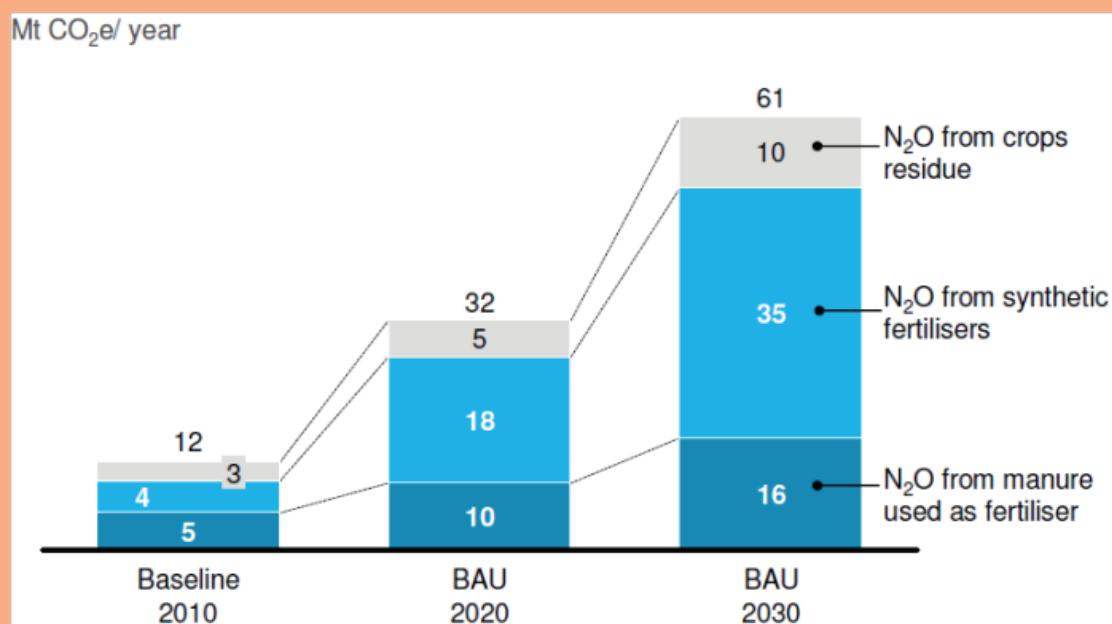
Baseline/BAU scenarios

How to define the GHG emissions baseline? Identifying the main sources of GHG emissions in the agriculture sector can help identify subsectors, regions or types of agricultural activity to be addressed in mitigation plans. Defining a baseline or business-as-usual scenario for GHG emissions is also a key part of estimating the mitigation potential of policies and measures.

How have countries approached baseline or business-as-usual scenario development? In general, two approaches have been adopted to quantify baseline emission scenarios. One approach, generally used to identify priority sectors in a framework LEDS, is to assess the contribution of the agriculture sector or particular subsectors to total national GHG emissions in a given historical year as recorded in the national inventory. For example, Colombia's national communication to the UNFCCC identifies the agriculture sector as the source of almost 40 percent of national GHG emissions in 2004. These emissions are being addressed through agricultural and environmental management programmes. Another approach, generally adopted when the purpose of the analysis is to identify specific priorities for mitigation within the agriculture sector, is to estimate the future trend in GHG emissions on the basis of a business-as-usual scenario. The business-as-usual scenario is defined as the emissions pathway that would be followed if development targets are achieved (including food security) but low-emissions policies and measures are not adopted. Constructing this scenario involves modeling the future development trajectory of the agriculture sector, a particular subsector or agricultural activity (see Box 9). Some estimates of mitigation potential are also made by comparing the effect of mitigation policies and measures with GHG emissions in a given baseline year. FAOSTAT, a global database of agricultural statistics, now contains Tier 1 estimates of agricultural and land use GHG emissions for each country. Where countries' GHG inventories do not yet cover agriculture, estimates from FAOSTAT may be useful in identifying historical baseline emissions and identifying agricultural emissions 'hotspots'. When used in combination with other sources of data, FAOSTAT may be useful for developing projections of future GHG emissions from agricultural activities at the sector or subsector level.

Box 9: Drivers of GHG emissions under a business-as-usual scenario in Ethiopia

Analyses that contributed to Ethiopia's Climate-Resilient Green Economy Strategy included developing business-as-usual scenarios for the major sources of emissions associated with each key sector. For emissions related to cropland and soil management, scenarios were developed that described projected changes in management activities and associated emissions from 2010 to 2030. The figure below shows the projected trend in emissions from synthetic fertilizers. The scenarios were developed using extrapolations of historical trends and assumptions drawn from a range of sources, including official targets in the medium-term national development strategy, published studies, and data on countries at a comparable level of development. The major drivers of increased emissions from synthetic fertilizer are identified as the amount applied per hectare and the number of hectares under cultivation. The projections suggest that nutrient management practices that increase yields while reducing emissions could be a priority for agricultural mitigation practices in Ethiopia. Similar analyses were presented in the strategy document for the livestock and forestry sectors.



Source: Federal Democratic Republic of Ethiopia, 2011

Understand barriers to adoption

What practical barriers to adoption of mitigation practices do farmers face? Many agricultural practices that can mitigate climate change are widely known. There may be several reasons why farmers have not already adopted these practices. Some common barriers to adoption are highlighted in Box 10. Policies and measures to promote adoption of mitigation practices should address the specific barriers to

adoption faced by farmers in the targeted subsector or region. This would allow for a more realistic assessment of the costs of mitigation programmes, potential adoption rates and their GHG mitigation potential. Most barriers to adoption of mitigation practices are not specific to GHG mitigation, but are also present when the practices are promoted for other agricultural development objectives. On the one hand, the presence of these barriers is indicative of the potential challenges to achieving GHG mitigation in the agriculture sector; on the other hand, they may serve to justify leveraging climate finance as a means to overcome them.

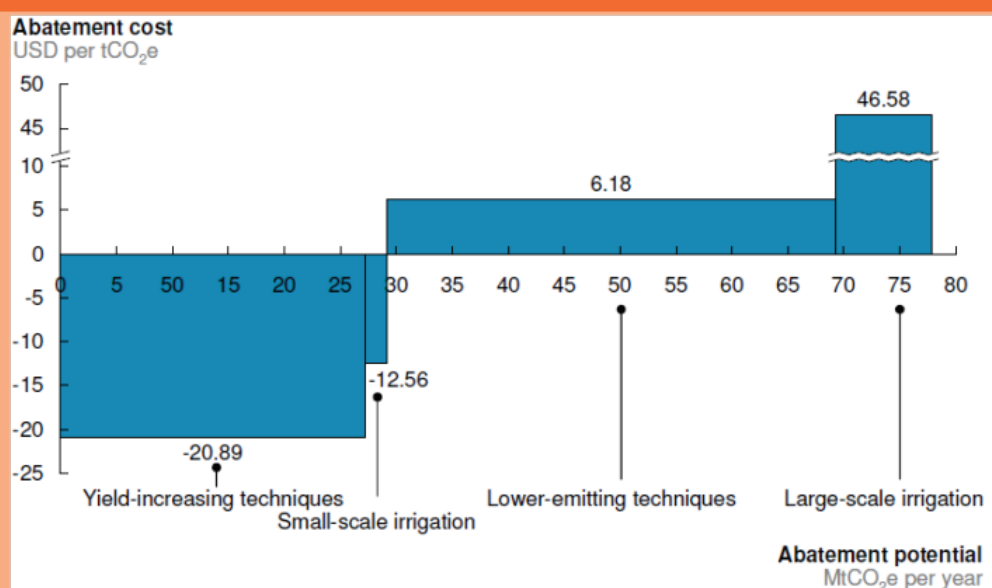
Box 10: Barriers to adoption of mitigation practices by smallholder farmers

Investment and cost barriers:

- Upfront investment costs, including costs of investment in equipment, machinery, materials and labour;
- Maintenance costs (recurrent expenditures after initial investment), such as the costs of seeds, fertilizer or hired labour, repair costs and the cost of credit repayment;
- Opportunity costs of household assets, such as land and labour allocated to mitigation practices;
- Transaction costs, including the time and travel costs of accessing technical advice or physical inputs and taking part in activities related to extension of mitigation practices;
- Risk costs related to the uncertainty of the likely benefits, which may dissuade farmers who lack insurance from adopting mitigation practices.
- Financial barriers to changing management practices are just one type of barrier faced by many small-holder farmers. Other barriers include:
- Institutional barriers, such as insecure land tenure, policy uncertainty, imperfect markets, limited access to technical extension services, or lack of institutions to support collective action. Constraints the quality of extension or rural credit services themselves may also limit potential for adoption by farmers.

Source: McCarthy, Lipper and Branca, 2011; FAOc, 2012

Box 11: Abatement cost curve for cropland management activities in Ethiopia



Source: Federal Democratic Republic of Ethiopia, 2011

How have countries approached understanding barriers to adoption? The most common approach to assessing potential barriers to adoption is to assess the economic costs and benefits of adopting mitigation activities. Mitigation plans in several countries have been informed by analysis that ranks and compares mitigation activities by the average cost per tonne of carbon dioxide equivalent (CO₂^{eq}) reduced by each management option and the total amount of GHG emission reductions that each option could achieve (see Box 11). However, abatement costs per tonne of CO₂^{eq} may differ from investment costs and provide a poor guide as to which measures can easily be adopted by farmers. The analysis is also sensitive to the types of costs that are considered (Tapasco, Jarvis and Wollenberg, 2012). Moreover, as Box 10 indicates, there are several dimensions to the costs faced by farmers and many non-financial constraints.

A technical assessment of feasible options is often conducted by teams of experts with in-depth familiarity with agriculture in the country. However, despite the importance of understanding barriers to adoption in agriculture, few agricultural mitigation plans appear to have been based on in-depth assessment of barriers to adoption faced by farmers. Other methods for assessing barriers to adoption are well-known, and may gradually become more widely applied in mitigation planning processes in the agriculture sector (Dow, Radzik and MacQueen, 2009). The experiences gained from past projects and pilot projects that have supported monitoring and evaluation systems designed to promote learning among stakeholders can also increase the understanding of barriers to adoption and help identify more effective policies and measures.

**Identify
policies and
measures**

What policies and measures can address identified barriers to adoption? To be effective, agricultural mitigation policies and measures should address specific barriers to adoption. An analysis of policies and measures may be conducted iteratively with assessments of implementation barriers and costs. Such an analysis may also be informed by lessons from prior projects or pilot initiatives in the country.

Support for the adoption of agricultural mitigation actions may also require policies and measures in other sectors (e.g. rural credit and employment).

How have countries identified appropriate policies and measures? In general, technical measures to mitigate GHG emissions have often been selected from long-lists of options drawn up by teams of experts and suggested by stakeholders in consultation processes. Existing sectoral and regional plans are also a source of potential options. In most mitigation planning processes, the long-list of options is screened according to various agreed criteria, including: feasibility, consistency with national or sectoral development plans; mitigation potential; cost-effectiveness; feasibility of GHG measurement; and synergies with adaptation to climate change.

To date, most agricultural mitigation plans have focused on identifying technical measures for support. The effectiveness of alternative policies and measures to support their adoption has received less attention, but can be expected to become the focus of subsequent planning phases. NAMAs, for example, may focus on strengthening policies and institutions (e.g., extension agencies) as a pre-condition for effective support to adoption of specific agronomic measures by farmers. Past sectoral programmes or projects, and policy or programme evaluations may provide useful information for identifying feasible and effective policies and measures. Mitigation programmes grounded in previous pilot experiences and developed through 'bottom-up' processes involving experienced farmers' organizations appear more likely to identify adoption barriers during the planning process than plans developed through a largely top-down, technical approach.

The analysis of the relationship between the specific financing needs in the agriculture sector and suitable forms of financial or policy support is another aspect of identifying mitigation policies and measures that have been outlined during planning. Box 12 illustrates the relationship between financing needs and suitable financing instruments. This type of analysis has been applied in some agricultural mitigation planning processes. For example, on the basis of cost-benefit analysis, agricultural options identified in Ethiopia's Green Economy Strategy were categorized into three types: options with a positive net present value (NPV) in the first five years that require short-term financing; options with a positive NPV over 20 years, but not in the first 5 years that require long-term financings; and options with a negative NPV over 20 years that require grant financing or performance-based payments based on GHG mitigation to increase the option's financial attractiveness. All options in the livestock sector were identified as requiring grant financing or performance-based payments. Around 40 percent of cropland management options were estimated to have positive returns within five years. An analysis of financial payback periods may indicate the need for long-term financing mechanisms.

Box 12: Matching finance tools to adoption barriers

Barriers to mitigation actions	Type of financing	Public finance mechanism
Low (or no) return on investment	Contribution to investment and operational costs	Up-front grant (e.g. direct subsidies, investment tax breaks, grant or concessional loans) Funding during operation (e.g. feed-in remuneration, carbon markets)
High up-front costs and lack of access to capital	Facilitate access to finance	Provide debt, e.g. loans or credit lines Provide equity Incentivize existing financial system
High risk	Provide risk coverage	Risk guarantees, insurance schemes
High transaction costs		Standardization and aggregation
Non-financial barriers (e.g. regulatory, lack of information or capacity)	Finance technical assistance	Mostly grants

Source: Würtenberger, 2012

Estimate mitigation potentials

What is the GHG mitigation potential of the proposed policies and measures?

Providing an estimate of the mitigation potential of policies and measures is often important in setting priorities and targets. For some sources of international or domestic finance, it is also a key criterion for justifying support. Ultimately, planning processes should estimate the mitigation potential of specific policies and measures. Different sets of policies and measures may lead to different adoption rates and have different mitigation potentials.

How have countries estimated mitigation potentials? Most agricultural planning processes to date have focused on identifying the key subsectors and generic technical measures to prioritize in the framework or national-level mitigation plans. There are few examples where the GHG impacts of specific policies and measures have been assessed. For example, agricultural NAMAs proposed by Indonesia and Papua New Guinea have been based on the estimated mitigation potential of the agriculture sector as a whole. NAMA proposals by Brazil, Ethiopia, the Former Yugoslav Republic of (FYR) Macedonia and Kenya have been made for generic actions within the cropping or livestock sectors (see Box 13). These estimates indicate large mitigation potential. However, they examine only the technical mitigation potential and do not consider economic or other barriers to adoption. The actual mitigation potential may be much lower. Estimates of technical mitigation potential are useful in the planning process and may guide priority setting and different stages. As mitigation plans are gradually elaborated into investment plans, estimates of mitigation potential can be improved by considering barriers to adoption, assessing the potential of specific policies and measures and gradually improving the data and assumptions used in the analysis.

Box 13: Estimated mitigation potentials of generic activities in selected countries

Country and mitigation action	Estimated emission reduction in megatonnes of CO ₂ eq
Brazil	by 2020
Reduction of Amazon deforestation	564
Reduction of Cerrado deforestation	104
Restoration of grazing land	83-104
Integrated crop-livestock system	18-22
No-till farming	16-20
Biological nitrogen fixation	16-20
Planted forests	8-10
Animal waste treatment	6.9
Ethiopia	by 2030
Ethanol/biodiesel production	1
Change herd mix for more efficient feed conversion	18
Better feed, breeds, management, lower age at off-take	17
Reduce draught animals population	4
Improved range management	3
Improved agronomic management of soils	40
Increase yields (better seeds, fertilizers, agronomic practices)	27
Irrigation in arid lands	2-9
Kenya	by 2030
Agroforestry	4.2
Conservation tillage	1.1
Fire reduction in crop- and grasslands	1.2

Box 14: Considering smallholder farmers in the technical dimensions of mitigation planning

Barriers to adoption: Mitigation planning processes are often prescriptive. They target their support and incentives to promote the adoption of particular farming practices. Successful planning and mitigation policies and measures that benefit farmers need to be based on a grounded understanding of farming systems and the multiple constraints that farmers face in adopting mitigation practices. These are likely to include a range of both financial and non-financial barriers. It may also be important to understand the constraints faced by supporting agencies, such as extension agencies or rural banks. Adoption barriers may present a particular risk for those NAMAs that propose transformational rather than incremental changes in agricultural practices. This is because a greater number of enabling conditions throughout agricultural value chains must be put in place to make adoption of the proposed transformational measures feasible.

Institutional dimensions of national mitigation planning

Institutional dimensions

Institutional arrangements for coordination

Engaging stakeholders

Financial institutions

MRV systems

Mitigation actions in the agriculture sector relate to other economic sectors and will require cross-government support and the involvement of stakeholders outside government. During the planning phase, coordination is required to ensure cooperation between government ministries and between different levels of government. Cooperation will also be needed to foster interactions among those responsible for the technical, policy and institutional dimensions of the planning process. Mechanisms to involve stakeholders outside government will also be needed, not only during the planning phase but also when opening up channels of feedback during implementation. Domestic and perhaps international sources of funding, such as the financial sector and businesses, will play key roles in enabling the implementation of mitigation policies and actions. Assessment of the appropriate roles for financial institutions and the barriers to their involvement can contribute to the design of feasible and effective policies and measures. Stakeholders will have various interests in monitoring and evaluating the progress and effectiveness of mitigation actions. Measurement, reporting and verification (MRV) systems should be designed to meet those various needs and build on existing national systems.

Institutional arrangements for coordination

Which government agencies are involved, and how will planning cross-government action be coordinated? Mitigation actions in the agriculture sector relate to other sectors managed by different government agencies (see Box 15). Climate change mitigation planning is often the mandate of the environment ministry, and is also closely linked with the mandates of planning and finance agencies. Cross-government coordination is important to secure political legitimacy and support for mitigation planning in the agriculture sector. Coordination among technical experts from different disciplines, and between experts and stakeholders working on the policy, technical and institutional dimensions of mitigation planning will also be necessary to ensure that these various dimensions are considered in an integrated manner. Clear institutional roles and mandates, and appropriate institutional arrangements for communication and collaboration can facilitate coordinated planning and action both within and outside the government.

What arrangements for coordination of mitigation planning have countries established? When developing national climate change plans, most countries have established interministerial coordination bodies at the national level. Often chaired by the office of the head of state, primary responsibility for coordination is generally delegated to environment or planning ministries. Where such institutional arrangements exist, they may provide a suitable platform for facilitating the links between the development of agricultural mitigation plans and national policies or policies in other sectors. Egypt, for example, has established a national team of experts responsible for assessing and surveying mitigation potentials in various sectors and developing specific NAMAs (UNFCCCb, 2012). The expert team is composed of representatives of relevant ministries and departments including: environment, energy, industry, petroleum, transport, agriculture, foreign affairs, international cooperation, housing and planning. In some cases, responsibility for planning of mitigation actions in agriculture has been delegated to ministries outside the agriculture sector. For example, in Uruguay, the Ministry of Industry, Energy and Mining is responsible for the development of the country's bioenergy NAMA. In Ethiopia, the Ministry of Transport is responsible for the ethanol and biodiesel production NAMA, while the Ministry of Agriculture is responsible for mitigation actions relating to livestock management, soil management and irrigation.

Once mandates for mitigation planning have been established, a range of institutional arrangements can be adopted to coordinate the planning process. In Ethiopia and Rwanda for example, sectoral teams comprised of national experts, supported by international consultants and working under mandates from the agency

Box 15: Sectors involved in adaptation and mitigation actions in Rwanda

Rwanda's green growth strategy identified 14 programmes of action, with some programmes targeting the agriculture sector. The strategy also highlights the fact that although lead responsibility can be assigned to individual ministries, the programmes cut across sectors and require cooperation across ministries and with stakeholders outside the government.

Programmes of Action	Sectors											
	Agriculture	Water	Land	Built Environment	Transport	Forestry	Mining	Energy	Industry	Health	Education	Local Government
1. Sustainable intensification of small scale farming	✓	✓	✓			✓					✓	✓
2. Agricultural diversity for local and export markets	✓	✓	✓		✓			✓	✓		✓	✓
3. Integrated Water Resource Management and Planning	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
4. Sustainable Land Use Management and Planning	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
5. Low carbon mix of power generation for national grid		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
6. Sustainable small-scale energy installations in rural areas	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
7. Green industry and private sector investment	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
8. Climate compatible mining		✓	✓		✓		✓	✓	✓		✓	✓
9. Efficient resilient transport systems	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓
10. Low carbon urban settlements		✓	✓	✓	✓			✓	✓	✓	✓	✓
11. Ecotourism, Conservation and PES Promotion	✓	✓	✓			✓		✓	✓	✓	✓	✓
12. Sustainable forestry, agroforestry and biomass energy	✓	✓	✓			✓		✓	✓	✓	✓	✓
13. Disaster Management and Disease Prevention	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
14. Climate data and projections	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: Asian Development Bank, 2013

responsible for the LEDS initiative, conducted assessment of options and potentials for the agriculture sector in the national LEDS planning processes (Republic of Rwanda, 2011; Federal Democratic Republic of Ethiopia, 2011). In other cases, such as Brazil, responsibility for planning and policy is retained by the responsible government agency, while specific technical tasks, such as estimating mitigation potentials, are delegated to specific research institutions. In general, because of the need for policy decisions to be made at various phases in the mitigation planning process, investment proposals for mitigation activities will not be produced during one single phase of the planning. Box 16 gives an example of institutional arrangements put in place in Kenya's National Climate Change Action Plan. In some countries, non-government actors, such as research institutes, NGOs and businesses, have also been leading the mitigation planning in specific agricultural subsectors and have established their own multistakeholder coordination mechanisms (see Box 17).

Box 16: Institutional arrangements for coordinating mitigation planning in Kenya

To operationalize the 2010 National Climate Change Response Strategy, a participatory process was carried out to design Kenya's National Climate Change Action Plan (NCCAP). The preparation of the NCCAP was headed by the National Climate Change Committee, which is chaired by the Office of the Prime Minister and whose members are drawn from line ministries. The Committee was mandated to ensure policy coherence and complementarity. Drafting of the NCAAP was coordinated under the leadership of the Ministry of Environment and Mineral Resources and guided by a multistakeholder, multidisciplinary taskforce that includes representatives from government ministries, the private sector and civil society organizations. Thematic working groups provided support and quality assurance to the specific subcomponents of the action plan, several of which relate to agriculture:

- **Subcomponent 1 - Long-term National Low-Carbon Development Strategy:** Within the agricultural sector, actions were prioritized that simultaneously deliver sustainable development, mitigation and adaptation benefits. Mitigation potentials were estimated for actions for which data existed and there were no barriers to implementation. Agroforestry, conservation tillage and reducing fire in crop- and grassland management were proposed as potential candidates for NAMA development.
- **Subcomponent 3 - Adaptation Analysis and Prioritization:** Besides the low-carbon priority interventions, other actions with adaptation benefits were identified in agriculture, including: the promotion of drought tolerant crops, water harvesting, integrated soil fertility management, insurance, price stabilization schemes for livestock, strategic food reserves, the provision of climate change information to farmers and pastoralists, and the mainstreaming of climate change into agricultural extension services.
- **Subcomponent 4 - Mitigation and NAMAs:** Based on the prioritization of the low-carbon development strategy, sector-specific NAMAs were further developed that described the development benefits, mitigation potentials and costs, and feasibility of implementation.
- **Subcomponent 6 - National Performance and Benefit Measurement:** The Ministry of Agriculture is developing a system to provide sector-specific data, based on a national performance and benefit measurement framework for measuring, monitoring, evaluating, verifying and reporting results of mitigation actions, adaptation actions and the synergies between them (Box 23).

The implementing agency for agricultural NAMAs is the Ministry of Agriculture. The Agriculture Sector Development Strategy (2010-2020) provides an implementation mechanism for the climate change action plan in the sector.

Source: Republic of Kenya, 2012

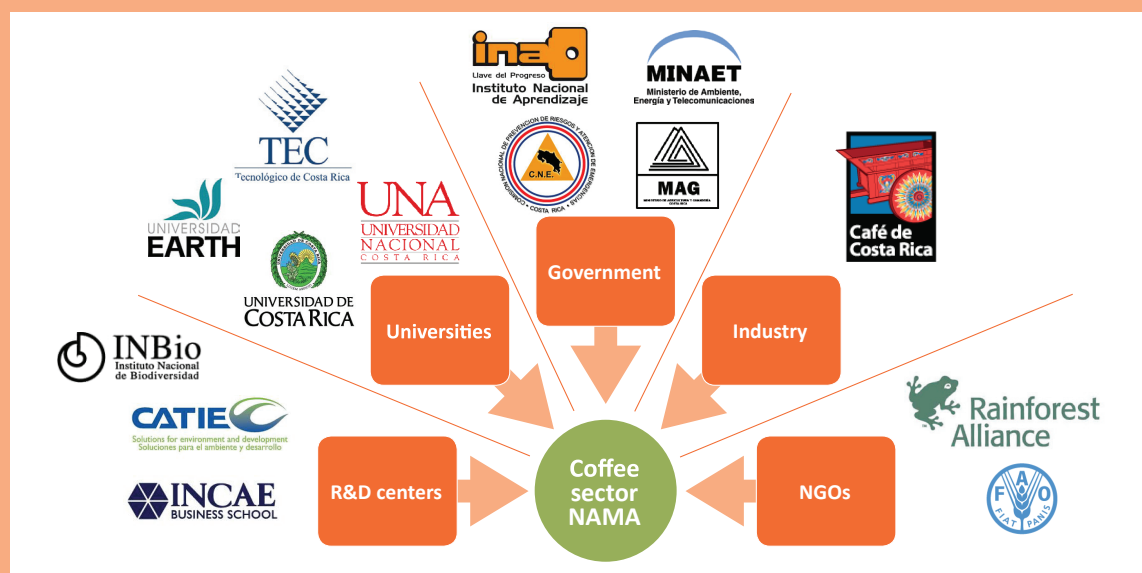
Engaging stakeholders

How can stakeholders be engaged and mobilized in planning and implementing mitigation options? A range of actors in the agriculture sector need to understand, support and implement agricultural climate change mitigation actions. Stakeholder engagement throughout the process serves several functions, including: raising awareness and understanding; generating ideas, proposals and feedback on proposals; enabling data collection; garnering support and buy-in; and obtaining agreement on principles and priorities (Project Catalyst, 2009). In many countries, organizations representing stakeholders outside government play major roles in supporting these functions. These functions are relevant not only during the initial phases of planning and consultation for the framework planning documents, but throughout the planning and implementation process. Box 18 lists a range of stakeholders in the agriculture sector and their potential roles in relation to mitigation planning. Parliamentary representatives can also make important contributions to both awareness raising and policy making (AWEPA, 2012). Depending on the national context and the nature of the proposed mitigation actions, formal arrangements for stakeholder participation in decision making may be necessary (e.g. where agricultural mitigation activities involve indigenous peoples) (IUCN, 2010).

Box 17: Actors in Costa Rica's coffee sector NAMA

In Costa Rica, the Ministry for Environment, Energy and Telecommunications through its climate change office, is the national focal point for climate change issues. It has elaborated a National Climate Change Strategy that recommends the mainstreaming of mitigation and adaptation into sectoral programmes, including agriculture. Making the country carbon neutral by 2021 is the main goal of the strategy's mitigation pillar.

Stakeholders in the coffee subsector, supported by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), have started to promote a Costa Rican coffee NAMA. The driving forces are: the Costa Rican Coffee Institute, with technical support from Coopedota R.L., a coffee producer, processor and marketing cooperative with 769 members; and CO2 Costa Rica, a think tank working to achieve the country's carbon neutral goal. This group has put forward an as yet unofficial NAMA proposal that focuses on GHG mitigation through the improved use of fertilizers. The Ministry of Agriculture and Livestock is also beginning to take ownership of the NAMA proposal. The stakeholders involved in this NAMA process are shown in the following figure.



Source: CO2 Costa Rica, 2012

How have countries engaged and mobilized stakeholders in agricultural mitigation planning? Wide ranging consultations on sectoral and regional priorities and options are a common feature of many mitigation planning processes. Some countries have also formalized institutional arrangements for involving stakeholders in policy dialogue beyond the initial consultation phase (see Box 20). Few national mitigation plans in the agriculture sector have gone into implementation. Most countries are still negotiating priorities and options, and there are few examples of institutional arrangements for the continued involvement of stakeholders in the ongoing decision-making process. In some countries, mitigation in the agriculture sector is closely linked with other discussions of agricultural development needs. In some countries, however, mitigation in agriculture has been seen as a concern imposed by donor preferences, and government planning in the sector has been perceived as primarily driven by the potential to access finance rather than by concerns to address ordinary farmers' needs (Sarpong and Anyidoho, 2012). Beyond formal mechanisms for stakeholder consultation, discussions about climate change mitigation in agriculture are also carried out through newspapers and other media, and civil society advocacy initiatives. Adopting a range of avenues for dialogue with representatives of farmers and other stakeholders may be useful to generate consensus on priorities and options that suit national circumstances. This is particularly the case if there are differing views between civil society groups or other stakeholders about proposed government plans.

Box 18: Potential roles of stakeholders in agricultural mitigation plan

Stakeholder grouping	Potential roles
Farmers, farmers' unions, farmers' organizations	To identify options and priorities for feasible mitigation action; to provide feedback on government and private sector initiatives; to lobby for farmers' interests; to raise awareness and motivate members to adopt mitigation practices; to participate in implementation of mitigation programmes.
Agribusiness and other private sector businesses	To identify and adopt profitable mitigation practices, and support adoption within their supply chains; to provide feedback to government on policies and plans; to work with government to develop and implement mitigation activities; to invest in profitable mitigation initiatives.
Civil society	To contribute to and provide feedback on government and private sector initiatives; to lobby for their constituent's interests; to monitor and help ensure accountability of the government and private sector; to raise public awareness and motivate individuals, institutions and authorities to take action; to provide services to support adoption of mitigation practices.
Research institutions	To provide education and training on agriculture and mitigation; to undertake basic and applied research on mitigation options; to contribute to analysis of policy needs and options; to manage the scientific knowledge base; to carry out applied research on GHG measurement and monitoring.

Financial institutions

How can mitigation policies and measures be financed? Some countries are supporting agricultural mitigation activities primarily through domestic fiscal budget lines and policies to leverage private investment. For many countries, however, an important goal of mitigation planning is to attract international financial support. In this regard, it will be important to match the priorities of international climate finance institutions to specific parts of domestic mitigation plans. Irrespective of the source of finance, delivery of financial support will be done through domestic financial institutions, and an understanding of existing options will support the development of credible implementation mechanisms.

How have countries addressed financing options? A number of middle-income and emerging economies have developed mitigation plans to be supported through domestic resources, including central government fiscal budgets, policy incentives for investment by the private sector and financial institutions, and in some cases, domestic emissions trading schemes. Many LEDS and NAMAs, particularly in lower-income countries, are developed with the intention of securing international support. Some LEDS, for example, specify actions that could be supported through the Clean Development Mechanism (CDM), international funding for Reducing Emissions from Deforestation and Forest Degradation (REDD+) funding, official development assistance or climate finance support for NAMAs.

Most climate finance is given in the form of concessional loans. Only a very small proportion comes in the form of grant aid (Hodas, 2012; Buchner *et al.*, 2012). A significant proportion of public climate finance is provided through private sector financial intermediaries (Whitely, 2013). These sources of finance have their own priorities. It is important to match potential funders with the priorities in domestic mitigation plans. In general, public sources of international climate finance prioritize support for readiness (e.g. mitigation planning); demonstrations (e.g. proof-of-concept for technologies or policies); and key investments that are likely to have transformative impacts on an economy's emissions pathway (Knight, 2012; Mabey, 2012). Box 20 indicates some criteria considered by climate finance institutions.

Source: Giordano *et al.*, 2011

Box 19: Institutional arrangements for stakeholder engagement in mitigation planning in South Africa

South Africa's framework plan for climate change envisages that most climate change actions will take place at the provincial and municipal levels. This should increase the ability of government to work together with business and civil society. Other government-led approaches are also used for stakeholder engagement:

- **National climate change conferences** provide opportunities for the government to communicate important messages and for stakeholders to become engaged in a limited way
- **Calls for public comments on policy and legislative documents:** Stakeholders are formally given opportunities to comment on policy documents. However, some stakeholders feel their comments are not considered, and some comments from stakeholders are not constructive.
- **Workshop and information sessions** organized by the government provide opportunities to discuss specific matters in detail with specific stakeholder groups.
- The **National Committee on Climate Change** is the official national platform for continuous stakeholder engagement on climate change. It ensures consultation with stakeholders from key sectors that are affected by climate change or that contribute to it. It is mainly accessible to selected stakeholders only.
- The **National Economic Development and Labour Council** provides a forum for representatives of organized business, labour and community groupings to interact with government. It can help ensure policy meets needs across society.

Source: Comstock and Davis, 2012

Box 20: Criteria for NAMA support considered by climate finance institutions

Standard practice among climate finance institutions in supporting NAMAs is still taking shape. However, a range of criteria shown in the table below are commonly considered by climate finance institutions. The specific criteria prioritized or applied by different climate finance institutions will vary.

Effectiveness	Implementation plan	Financing plan
Level of GHG reductions	NAMA description with clear boundaries and plans	Budget with national contributions
Transformational change	Consistency with national development plans	Catalytic impact of international finance contribution
Sustainable development benefits	High-level political support and country ownership	Leveraging private-sector investment
Overcomes barriers (e.g. technology, capacity)	Support from sector stakeholders	No duplication with other finance sources
Sustainability and replicability	Capacity to implement	Clear exit strategy for funders
MRV of GHGs and other performance metrics		Risk mitigation

Box 21: Financial institutions in rural development in Mexico

Nacional Financiera is the principal financial agent of the Mexican federal government responsible for negotiating and obtaining lines of credit from the multilateral and bilateral agencies. It also coordinates support for a number of individual programmes, including: the Mexican Forest Fund which provides payment for environmental services; the Mexican Carbon Fund, which promotes the development and use of low-carbon emission technologies; and Support Services for Agricultural Marketing, which works to liberalize markets and channel financial resources directly to producers.

Financiera Rural is an agency within the Mexican Ministry of Finance dedicated to supporting rural development. It offers two primary forms of assistance: loans and technical training. Funded through congressional appropriation, the agency acts as both a first- and second-tier lending institution. *Financiera Rural* has forged partnerships with the Inter-American Development Bank to finance low-carbon emissions strategies for rural development. Their Forest Investment Plan has been integrated into the national REDD + strategy.

Fideicomisos Instituidos en Relación con la Agricultura (Trust Funds for Rural Development) is a collection of four trusts. They operate as second-tier development banks passing resources through intermediaries (including commercial banks, credit unions and other financial institutions) to eligible borrowers in rural areas. Priority is given to projects that encourage producer sustainability, including climate change risk management plans, increased access to carbon markets, production of biofuels, installation of anaerobic digesters, conservation of soil and irrigation water, and reforestation.

Although private sector institutions often deliver public climate finance, there are increasing calls to channel climate finance through recipient countries' financial management systems (Fourth High-Level Forum on Aid Effectiveness, 2011). Both domestic fiscal resources and international climate finance will most likely be disbursed through existing financial institutions. An assessment of the existing institutional landscape and the role different financial institutions have played in past policies and measures can be useful in identifying stakeholders in the financial sector and any barriers to involvement they may face, and developing practical delivery mechanisms for mitigation policies and measures (see Box 22). Where finance for agricultural mitigation options are provided through financial sector institutions, activities may be required to ensure that bank managers are aware of and understand the agricultural mitigation programme (see for example Stabile, Azevedo and Nepstad, 2012). Public expenditure reviews are also beginning to inform national climate finance strategies. Several countries have identified the need to establish a national financial institution for securing and channeling international climate finance and linking international with domestic finance (Fu-Bertaux and Fröde, 2012). Decisions regarding the design of a national climate fund should consider opportunities and needs in other sectors beyond agriculture. Where relevant, it may also be helpful to consider the specific needs of the agriculture sector when designing the fund.

MRV systems

How will GHG impacts and other performance metrics be measured, reported and verified? GHG inventory guidelines provided by the IPCC, carbon accounting and monitoring methodologies approved for use in the CDM, and voluntary carbon market standards can provide some guidance on technical approaches for measuring GHG impacts of agricultural mitigation policies and measures. However,

experience from project-based approaches suggests that the transaction costs for monitoring using project-based methodologies can be high. The potential to reduce transaction costs by developing alternative monitoring approaches is one reason the agriculture sector has attracted interest regarding the development of mitigation instruments, such as NAMAs. One approach is to use existing national systems to build MRV systems. Technical approaches to GHG measurement are only one aspect of MRV. A basic function of an MRV system should be to assist developing countries in managing for results. In particular, considering the numerous barriers to adoption for many agricultural practices,

MRV systems should support evaluation of actions and inform continual improvement of NAMA implementation. In many developing countries, agricultural monitoring and evaluation systems are not meeting stakeholders existing needs for information (Haddad, Lindstrom and Pinto, 2010). The development of MRV systems can help to strengthen existing monitoring and evaluation systems.

How have countries addressed MRV? As yet, there has been no international agreement on MRV standards for internationally supported actions. In some countries that are primarily promoting agricultural mitigation through domestic support, proposals have been made for basing MRV systems on existing domestic systems. In Colombia, for example, experts have suggested that MRV for NAMAs can be integrated with the existing verification system used by the government to verify progress made in achieving the goals set out in its National Development Plan (Cadena and Rosales, 2011). An information system managed by the National Planning Department uses verifiable numerical targets and indicators derived from the National Development Plan. Evaluations of the National Development Plan are reported periodically to ministries, administrative departments, sector agencies, the council of ministries, the National Planning Council and the National Congress. Experts have identified a small number of additional indicators required for MRV of NAMAs, which are not yet included in the existing system, and have suggested that these indicators could in principle be incorporated into the system. Box 22 provides an example of an existing national MRV system in the agriculture sector. It illustrates how a national MRV system could provide the basis for a NAMA MRV system.

Some countries have decided to establish new national MRV systems that incorporate existing data sources and reporting mechanisms, and add new components to meet climate change mitigation and adaptation information requirements. For example, the Government of Kenya has announced the design of a National Performance and Benefit Measurement Framework (NPBMF) to measure, monitor, evaluate, verify and report results of mitigation and adaptation actions and look at the synergies between them (Republic of Kenya, 2012). The NPBMF responds to government's need for information on the effectiveness of both mitigation and adaptation actions. This 'MRV+' system builds on existing monitoring and evaluation systems of central government agencies and the national statistical reporting system. It also proposes new institutions to use the information generated for monitoring and evaluation purposes from the local to the national level. The system will include a standardized performance-monitoring framework for agricultural sector climate benefits, including NAMAs (Box 24). Developing and operating the system will require considerable investment in capacity building. It may take several years for the system to become fully operational.

Box 22: Key features of an existing national MRV system for grass planting activities in China

In China's Qinghai Province, the masterplan for a large nature reserve includes activities to restore degraded grasslands. From 2005 to 2010, more than 50 000 hectares of degraded land were planted with grass. This was funded primarily from central government resources.

Planning: Institutional arrangements and procedures for MRV of the grass planting scheme start with the planning, design and implementation process. After budget approval, a detailed implementation plan is drafted by the executing agency, in this case the national Agriculture and Animal Husbandry Bureau (AAHB). The plan has to be approved together with the budget estimate, schedule, expected impacts and an outline of implementation arrangements by the provincial AAHB. A technical design plan follows and both documents become binding throughout project implementation. The role of county execution agencies is determined in implementation contracts, and an agency is contracted by the provincial AAHB to provide independent supervision and quality management services.

Measurement: In this programme, measurement refers to input and activity monitoring. Measurement takes place during the technical design stage, when the geographical location of each site and its boundaries are specified using a Global Positioning System. The method for grass planting in each plot is recorded, and quantities of inputs (e.g. seed, fertilizer or fencing) are specified. The location, contents, scale and standards for planting activities are set out in the technical design plan and must be followed during implementation.

Reporting: An independent supervisory agency provides monthly reports on quality management and technical issues to the provincial AAHB and submits its recommendation for reimbursement of project expenses at the end of each year. There is also a project file management system in place that records all project-relevant data from plot locations, written reports and audiovisual material. Annual progress reports are submitted by the county to the province and form the basis for annual evaluation.

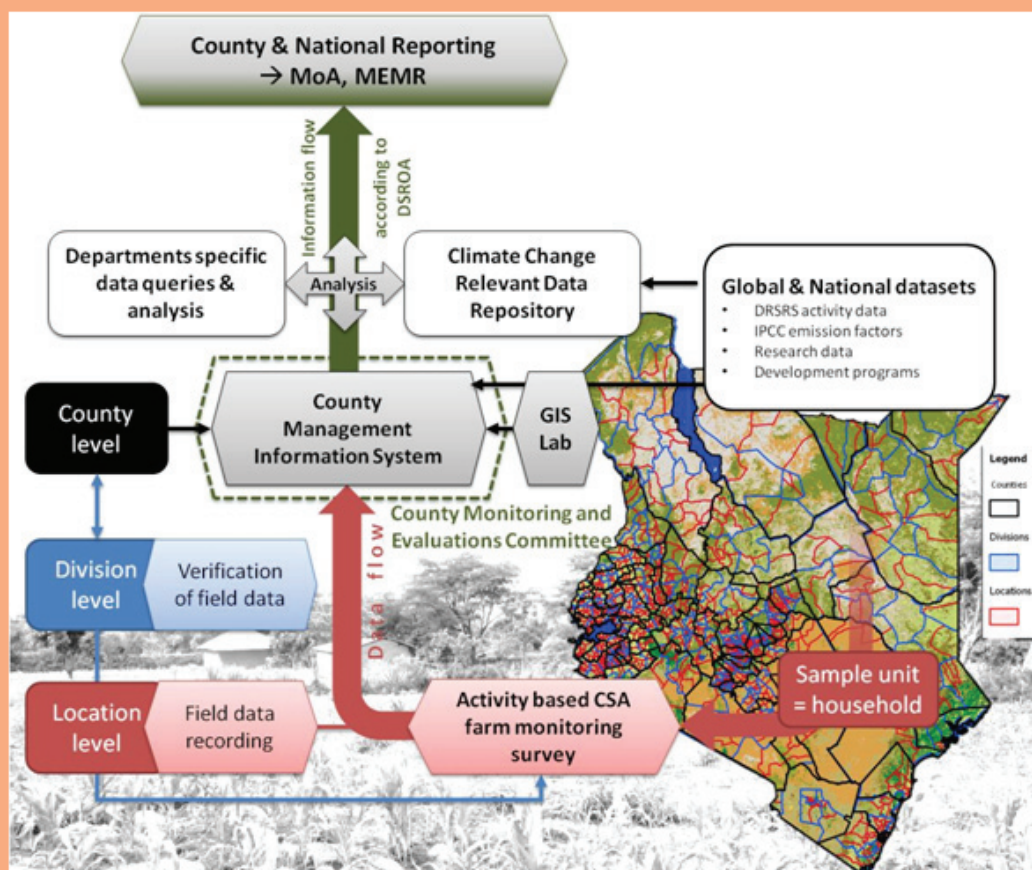
Verification: After the annual evaluations are completed, a verification of the project and its sub-components is conducted. The purpose of this verification is to make an assessment of the annual plan and the project contents. The verification also determines whether the project adhered to the review and approval requirements, design requirements, project management requirements and quality standards, fund use regulations and investment efficiency guidelines, and project operational management requirements. For each county, the prefectural AAHB jointly undertakes a self-inspection that must include on-site visits to at least 30 percent of project households. Provincial and national authorities also make an independent evaluation based on the results of the local-level verification.

The existing national system may provide a credible basis for MRV of NAMAs because: MRV procedures are explicitly stated in written regulations that are publicly available; the MRV system includes provisions for quality control and quality assurance; and the MRV system is based on institutional arrangements that provide accountability in ways that are appropriate to the national context.

Source: Wilkes et al., 2011

Box 23: Concept of an agricultural MRV+ system in Kenya

The Climate Change Unit in Kenya's Ministry of Agriculture is coordinating efforts to design a system to monitor the benefits derived from agricultural adaptation and mitigation actions. By providing sector-specific data on adaptation and mitigation for national planning and reporting, the proposed system (Agri MRV+) bridges the gap between current agricultural monitoring and evaluation and the national level cross-sectoral MRV. The system is based on existing institutional structures that provide accountability in ways appropriate to the Kenyan context. Existing remote sensing and other data sets (e.g. from the Kenya National Bureau of Statistics) will be used to identify different farming systems and determine the necessary number of household surveys per farming system. Proxy data for quantifying adaptation and mitigation progress will be collected at the household level and analysed at the county level, where a management information system will be established. The system is designed to allow for measuring, reporting and verifying mitigation activities in the framework of agriculture sector NAMA as described in Box 16.



Source: Republic of Kenya, 2012

Box 24: Considering smallholders in institutional dimensions of mitigation planning

Engaging farmer representation in policy processes: Farmers are often less well organized than stakeholders in other economic sectors. Also differences among farmers may be reflected in their interests in relation to policies. Involving a diverse range of farmers in consultation and planning can be a challenge. However, it can serve to greatly benefit awareness raising within the sector, identify feasible options and garner support for the resulting plans.

Addressing constraints in supporting institutions: In many countries, farmers face barriers in accessing credit from rural financial intermediaries. Access to effective extension services is also often limited. While most mitigation planning to date has focused on identifying investment options, addressing the barriers to effective services and credit provision by government and non-government agencies serving rural areas may be necessary to identify effective policies and measures that can support adoption of mitigation practices.

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This guide describes two of the main approaches to greenhouse gas mitigation planning in developing countries: Low-Emission Development Strategies (LEDs) and Nationally Appropriate Mitigation Actions (NAMAs). It explains the possible relationships between them and their status within the United Nations Framework Convention on Climate Change (UNFCCC).

National mitigation planning processes have policy, technical and institutional dimensions that need to be addressed in an integrated and iterative manner. For each of these dimensions four key elements are outlined. Examples from mitigation planning processes in developing countries are provided to illustrate the range of options for addressing these key elements in country-specific ways. Special considerations for including smallholder farmers in the planning process are highlighted.

