Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: Adapting MRV Methodology

Louis Bockel, FAO
Laura Vian, Consultant FAO
With the support of Claude Torre, AFD

This study targeting three countries, Colombia, Mexico and Peru, aims to provide National Development Banks (NDB) a project monitoring mechanism of the impact of greenhouse gases and adaptation to climate change.

February 2016
Acknowledgments

The preparation of this publication has been a collaborative effort which was peer reviewed in 14 December 2015 by professionals from different FAO Divisions, ESA and NRC and by experts from IFAD, AFD, FFEM, FIRA, CIPCA and AGROBANCO. Main authors were Louis Bockel, Laura Vian, with the support of Claude Torre from AFD, and the supervision of Leslie Lipper (ESA).

The coordinating authors thank the following reviewers for their valuable review and comments of a draft of this publication: Claude Torré (AFD), Balineau Gaelle (AFD), Edant Caroline (AFD), Erick Rodriguez Maldonado (FIRA), Matias Estela (AGROBANCO), Martial Bernoux (NRC), Janie Rioux (NRC), Kaisa Karttunen (NRC), Elisa Distefano (IFAD Consultant), Pamela Cartagena (CIPCA)

Anass Toudert provided editorial support for the text and design. Responsibility with the content lies with the authors.
Table of Contents

Glossary of Climate Change Terms ................................................................. 8
Summary ............................................................................................................ 10
Introduction ...................................................................................................... 14

1. Background .................................................................................................. 17
   1.1 AFD and Latin America Investment Facility (LAIF) ...................................... 17
   1.2 The International Development Finance club (IDFC) ................................. 19
   1.3 The role of National Development Banks as key actors of climate change .... 20
   1.4 The role of NDBs in the Latin American region ........................................... 21
      1.4.1 Green Financial Products ...................................................................... 23
      1.4.2 Participation in the Clean Development Mechanism .............................. 23
      1.4.3 REDD+ Instruments ........................................................................... 24
   1.5 The National Development Banks targeted by the MRV methodology ......... 25
      FINAGRO – Colombia .................................................................................. 26
      AGROBANCO – Perú .................................................................................... 26
      FIRA – Mexico ............................................................................................ 27

2. Agricultural Investment Projects and their Impact on Mitigation and Adaptation .... 28
   2.1 Agricultural Mitigation options .................................................................... 29
   2.2 Agricultural Climate Adaptation and Resilience options ................................. 32
      Water-linked management practices ................................................................ 33
      Adaptation of soil management practices ....................................................... 33
      Adaptation of crop management practices ..................................................... 34
      Agro-forestry and reforestation as an adaptation measure .............................. 34
      Adaptation of livestock, pasture and rangeland management practices ......... 34
      Climate Resilience options ............................................................................ 35

3. Capitalization of Experiences of MRV methods on AFOLU Investment Projects .... 37
   3.1 Definition: a notification system for monitoring and verification (MRV) of the impact of climate-related projects ................................................................. 37
   3.2 Guiding Principles derived from practical experiences ................................. 39
   3.3 Towards a MRV system suitable for agricultural investment projects .......... 43

4. Proposed Method of Analysis and Monitoring of Climate Impact of Bank Projects .... 45
   4.1 Basic principles ............................................................................................ 45
   4.2 Quantitative Indicators of carbon effects ..................................................... 45
   4.3 Quantitative Indicators of Resilience to Climate Change ............................... 46
   4.4 Qualitative analysis of resilience factors: Global Incremental Resilience Index (GIRI) 47
   4.5 Performance Indicators on income and resources (water, energy) ............... 47

5. Modalities of Data Entry and Analysis on Ex-Act MRV Tool ................................ 48
5.1 Entering general data: Project, climate, soil, financing .................................................... 48
5.2 Filling land use change data .................................................................................................. 48
5.3 Entering agricultural activities data: annual crops, perennial and rice ................................ 49
5.4 Entering Livestock and Grassland Management data .......................................................... 50
5.5 Entering inputs and Investments data .................................................................................. 51
5.6 Entering other data required for MRV ................................................................................. 52
5.7 Filling the series of qualitative resilience criteria ................................................................. 52
5.8 Set of impact results provided by investment project ............................................................ 54
  5.8.1 Multi-impact Summarized results per project ................................................................. 54
  5.8.2 Detailed results of GHG impact per project ..................................................................... 55
  5.8.3 Modalities of aggregation by investment bank projects portfolio .................................. 55

6. Countries Report on AGROBANCO, FIRA and FINAGRO and lessons learned .......... 56
6.1 Case study: AGROBANCO – Perú ....................................................................................... 56
  Main support funds to agriculture and credit administered by the Bank .................................. 57
  Green Bank Plan .................................................................................................................... 57
Lessons learned from pilot implementation process .................................................................. 58
  a) Which level and which type of appraisal will be selected .................................................. 59
  b) Results per ha and per beneficiary ..................................................................................... 60
  c) Options of Portfolio Aggregated results ............................................................................ 60
  d) Further analysis foreseen ..................................................................................................... 61
6.2 Case study: FIRA – Mexico ................................................................................................ 61
  FIRA actions to boost the financing of sustainable projects with green financial products .... 62
  FIRA Programs for climate change ....................................................................................... 63
Lessons learned from pilot implementation process .................................................................. 64
  a) Foreseen steps of MRV building ....................................................................................... 64
6.3 Case study: FINAGRO - Colombia .................................................................................... 65
Green Protocol .......................................................................................................................... 66
  Management of the Agricultural Guarantee Fund – FAG ..................................................... 66
  Services offered by FINAGRO in the sustainable forestry and agriculture framework .......... 66
Lessons learned from field visit ................................................................................................ 68
  a) Focus areas selected ............................................................................................................ 69

7. Guidance towards MRV methodology building for National Development Banks ........ 70
7.1 NDBs in line with countries’ green planning perspectives .................................................. 70
7.2 Towards a step – by step design process ............................................................................. 71
7.3 Foreseen perspectives open by a performing MRV system ................................................. 72
7.4 Peer Review Recommendations and Conclusions ............................................................... 73

Bibliography ............................................................................................................................. 75
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

Annexes: Detailed Review of Initiatives ................................................................. 78

Annex 1: MRV in preparation in Green Climate fund ............................................. 78
Annex 2: ASAP Program - IFAD ........................................................................... 80
Annex 3: Farmers performances monitoring in Madagascar (FAO 2014) .................. 83
Annex 4: IIED- Evaluation based on the integration of climate risk into development .... 85
Annex 5: The Pilot Program for Climate Resilience (PPCR) ................................... 87
Annex 6: The Adaptation Fund ............................................................................. 89
Annex 7: GEF-CBP Landscape Carbon Monitoring, Reporting and Verification System .... 91
Annex 8: GEF-AMAT (Adaptation Monitoring and Assessment Tool) ..................... 92
Annex 9: Environmental screening for UNDP projects ......................................... 94
Annex 10: FAO TCI Guidance ............................................................................. 95
Annex 11: FAO ESA working document: Resilience check – Assessing the contributions of agriculture and forestry development projects to climate resilience ...................... 96
Annex 12: Peer review recommendations and conclusions .................................... 99
List of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF</td>
<td>Adaptation Funds</td>
</tr>
<tr>
<td>AFOLU</td>
<td>Agriculture, Forestry and Other Land Use Change</td>
</tr>
<tr>
<td>AFD</td>
<td>Agence Française de Développement</td>
</tr>
<tr>
<td>ALIDE</td>
<td>Association of Latin American Financial Development Institutions</td>
</tr>
<tr>
<td>CC</td>
<td>Climate Change</td>
</tr>
<tr>
<td>CCAFS</td>
<td>Climate Change, Agriculture and Food Security</td>
</tr>
<tr>
<td>CGIAR</td>
<td>Consultative Group for International Agricultural Research</td>
</tr>
<tr>
<td>CIAT</td>
<td>International Center for Tropical Agriculture</td>
</tr>
<tr>
<td>CIF</td>
<td>Forestry Incentive Certificate</td>
</tr>
<tr>
<td>EX-ACT</td>
<td>EX-Ante Carbon-balance Tool</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
</tr>
<tr>
<td>FDI</td>
<td>Financial Development Institutions</td>
</tr>
<tr>
<td>FIRA</td>
<td>Fideicomisos Instituidos en Relación con la Agricultura</td>
</tr>
<tr>
<td>GCF</td>
<td>Green Climate Fund</td>
</tr>
<tr>
<td>GCFM</td>
<td>Global Climate Financing Mechanism</td>
</tr>
<tr>
<td>GEF</td>
<td>Global Environment Facility</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse Gas Emissions</td>
</tr>
<tr>
<td>GIEC</td>
<td>Groupe d’experts intergouvernemental sur l’évolution du climat</td>
</tr>
<tr>
<td>GTZ</td>
<td>Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH</td>
</tr>
<tr>
<td>IDFC</td>
<td>International Development Finance Club</td>
</tr>
<tr>
<td>IFAD</td>
<td>International Fund of Agricultural Development</td>
</tr>
<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
</tr>
<tr>
<td>LAC</td>
<td>Latin America and the Caribbean</td>
</tr>
<tr>
<td>LFI</td>
<td>Local Financial Institutions</td>
</tr>
<tr>
<td>NDB</td>
<td>National Development Banks</td>
</tr>
<tr>
<td>MRV</td>
<td>Measurement, Reporting, Verification</td>
</tr>
<tr>
<td>OCDE</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>ODI</td>
<td>Overseas Development Institute</td>
</tr>
<tr>
<td>PES</td>
<td>Payments of Environmental Services</td>
</tr>
<tr>
<td>PPRC</td>
<td>Programme Pilote pour la Résilience Climatique</td>
</tr>
<tr>
<td>SARAS</td>
<td>Sistema de gestión de Riesgos Sociales y Ambientales</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
</tbody>
</table>
Glossary of Climate Change Terms

Climate adaptation

Climate adaptation refers to the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damage, to take advantage of opportunities, or to cope with the consequences. The IPCC defines adaptation as the, “adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation.”

Adaptive Capacity

The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.

Carbon Sequestration

Terrestrial, or biologic, carbon sequestration is the process by which trees and plants absorb carbon dioxide, release the oxygen, and store the carbon. Geologic sequestration is one step in the process of carbon capture and sequestration (CCS), and involves injecting carbon dioxide deep underground where it stays permanently.

Carbon Sink

An ocean, forest, or other area of vegetation (=plants and trees) that helps to protect the environment by taking in large amounts of carbon dioxide from the atmosphere.

CDM (Clean Development Mechanism)

The CDM allows greenhouse gas emission reduction projects to take place in countries that have no emission targets under the United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol, yet are signatories.

Climate Mitigation

A human intervention to reduce the human impact on the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks.

Co-Benefit

The benefits of policies that are implemented for various reasons at the same time including climate change mitigation acknowledging that most policies designed to address greenhouse gas mitigation also have other, often at least equally important, rationales (e.g., related to objectives of development, sustainability, and equity).

1 EPA, 2015 Glossary of Climate Change Terms, United States Environmental Protection Agency http://www.epa.gov/
Resilience

The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change.

Vulnerability

The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed; its sensitivity; and its adaptive capacity.
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

**SUMMARY**

Agriculture, forestry production and land use change (overwhelmingly related to agriculture) represent one quarter of greenhouse gas emissions (GHG) (IPCC, 2014).

Three quarters of the world's poor population live in rural areas (where 80% of revenue comes from agriculture) and an increase in GDP contributes four times more effectively in reducing poverty when such increase comes from agriculture, than another sector (WB 2007). In this context, small farmers are especially vulnerable to the effects of climate change. If these effects are highly visible on agricultural production, they also impact the rural infrastructure, market access and agricultural financing (making it more risky).

Latin America does not contribute greatly to greenhouse gas emissions (GHG) compared to northern countries, but its contribution is growing due to the increase in energy consumption. Emissions per capita are modest: 3 tonnes CO2-eq per capita in 2004, against 7 in France, but the land use changes have a particular weight in Latin American programs, far ahead of other sectors in the subcontinent.

The financing of agricultural investment is necessary to increase productivity, improve farm incomes and acquire new assets to cope with shocks, allowing improvement of resilience and adaptation to climate change (CC). In general, the development of financial services (credit, savings, insurance) in rural areas allows the establishment of a protective institutional environment that enables rural people to face risks related to climate (decline in agricultural production, e.g. as a result of reduced precipitation or extreme event).

Significant investments are needed to support the global transition to a low-carbon, climate resilient future. Unlocking private sector capital will be essential to achieve large, transformational, and long term impacts across all economies. However, significant questions remain about how to mobilize private investment in climate change activities, how to design risk-return arrangements that attract public and private capital, and ultimately how to align public and private investment incentives (Smallridge D, 2012).

Many investment projects which have "climate co-benefits" in the agricultural and forestry sector are set up by the financial sector of developing countries, particularly by public development banks. National Development Banks are increasingly integrating climate change considerations in their core operations, and are more and more active in financing climate change interventions. It progressively strengthens the role they play in channeling funds towards low-emission projects and programs (Smallridge D, 2012). A recent study from the International Development Finance Club (IDFC) demonstrated that NDBs total green finance commitments in 2014 already amounted to US$ 98 billion mostly devoted to green energy and mitigation of GHG emission reductions (WRI-Ecofys-IDFC, 2015)

We can assist to a growing tendency, in many Latin American countries, towards the development and implementation of green policies, which aims at addressing the issue of climate change. In this framework, financial institutions and national banks in these countries are very active in supporting green projects in the AFOLU sector, within their investment credit line.

In Latin America, many Development Finance Institutions (DFI), have explicitly incorporated the environmental variable within the policies that determine their actions. Some of them are directly supported by AFD through dedicated credit lines and providing them financial support and technical assistance, as it is the case of FIRA in Mexico and Agrobanco in Peru. In this context, AFD strategy
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

of promoting green and inclusive growth in emerging countries allowed the agency to become one of the global leading players on climate action and to contribute to policies implemented by the countries it supports, in order to limit the environmental footprint of rapid growth.

However, many of these financial institutions lack i) a strong managerial control of ESG (Environmental, Social and Governance)-related risks and ii) a structured and functioning MRV (Measurement, Reporting, and Verification) system in order to track progress of these investments and measure the sustainability of green projects in the AFOLU sector and their impact on climate. For this last point, the design of an appropriate mechanism for MRV, which reduces the complexity and high costs of current systems and is based on easy and accessible data gathering, is a main issue. It will need to define indicators of climate change (adaptation and mitigation) and a methodology suitable for portfolios of bank financing or project financing funds. Such a system would be very useful to cover portfolios of small projects, in order to contribute to the greening process of the global financial system.

In order to credit and finance development projects, which contribute to mitigation and adaptation, it is necessary to have a system of MRV that ensures that mitigation benefits are actually achieved. MRV is a key element in assessing the potential for linking mitigation benefits to smallholder agricultural systems, since they involve significant costs and they affect the uncertainty factors and risk associated with any specific action.

The transformation towards a low-carbon, climate resilient environment requires a large and constant flow of funding, which is not always easily provided by the governments. This is the reason why the mobilization of private sector investments in climate change mitigation is essential and NDBs can play an important role in scaling up private sector investments and help to overcome some of the existing barriers private market will not bear.

Because of their characteristics and their deep knowledge of the national context in which they operate, NDBs play a key role in developing financial instruments to leverage financial resources and to mobilize investments of the private sector in sector programs mitigation.

The majority of climate finance is not distributed directly by governments to end users, but rather through banks and government agencies. Bilateral and multilateral financial institutions play a key role in the distribution of climate finance, accounting for approximately 40% of the total.

NDBs can play a dual role in this context, complementing and catalysing private sector investments. Their great knowledge and consolidated relationship with the local private sector place them in a privileged position to understand local barriers to investment, allowing them to design a financing package tailored to the needs of local investors. In addition to providing financial and non-financial instruments to directly engage the private sector and mobilize it, they can also act as security devices to generate market and investments, providing additional incentives for this sector in order to increase their investment. Compared to commercial banks and investment funds, NDBs have greater potential to take risks that stimulate long-term investments.

The MRV methodology for monitoring of green agriculture and forestry investments, developed by FAO in collaboration with AFD, is designed to measure both the impact of mitigation and adaptation projects in the AFOLU sector, specifically for groups of projects belonging to NDBs' portfolio. Mitigation indicators measure the project's impact on emissions of greenhouse gases, while adaptation indicators measure the reduction of vulnerability of people, livelihoods and ecosystems to climate change. The impact on climate mitigation is reflected through quantitative indicators, derived directly from the EX-ACT tool (Ex-Ante Carbon Balance Tool), developed by FAO in 2009. These indicators are used to obtain and analyze the mitigation impacts in terms of tCO2 of the project and also the equivalent economic return, which could be an important aspect to consider when attempting, for example, to access payments for environmental services. The dimension of
climate resilience is assessed using simple quantitative but also qualitative indicators. The methodology takes into consideration the aspects of mitigation, adaptation, resilience and economic impact.

The MRV tool is based on the need for simple mitigation, adaptation and resilience indicators, easy to collect and to aggregate, which develop a measurable and concrete tracking system, in order to develop an accurate assessment of the impact of agricultural investments.

The proposed indicators are associated with methods of collection and structured analysis in an Excel file that constitutes an MRV tool designed to simplify the analysis and follow-up by project and aggregation. The file includes a module on Project Data, a module on carbon footprint analysis and a module on MRV Results which combines all results.

This work, developed in collaboration between FAO and AFD, is based on an iterative process characterized by the following actions (i) developing a methodological proposal based on the capitalization of experiences, (ii) presenting and discussing the methodological proposal with the heads of national banks, (iii) testing with partners (iv) discussing the results, and (v) adjusting it according to the characteristics and needs of the institutions. The study targets three NDBs in Latin America: Agrobanco in Peru, FIRA in Mexico and FINAGRO in Colombia.

Agrobanco, as a first tier bank, mainly provides first level credit to natural and juridical people in the following agricultural sectors: agriculture, livestock, forestry, agroindustry, aquaculture and activities related to transformation and commercialization of products coming from these sectors; and second level credit to financial entities, as an intermediary.

FIRA is a second tier development bank that offers credit and guarantees on agriculture, but also provides training, technical assistance and technology-transfer support to the agriculture, livestock, fishing, forestry and agribusiness sectors in Mexico.

FINAGRO is a second tier bank that provides financing to first tier banks such as Banco Agrario and private banks. Through this mechanism, farmers can access funding under preferential interest rates.

During the first field visit each national context has been analyzed and the banks’ profile has been detected. In this framework, the methodology has been presented and subsequently refined and adapted to the individual context. During the second field visits, trainings to the NDBs’ representatives were conducted, in which more detail information of the tool and of the methodology was provided. During these trainings, a set of projects related to the NDBs’ green portfolios were also appraised.

The approach used has helped to identify a set of actions and decisions to take at the level of National Development Banks, in order to build their own monitoring system of impact of investment projects on climate adaptation and mitigation. This is still an ongoing process open to modifications and improvements following a constructive discussion with the direct actors of the NDBs involved in the study, in order to build a suitable and efficient MRV system which can be effective and adapted to each national context.

The process of adapting the methodology to the NDBs’ needs has been implemented with the active participation of the financial institutions and it is still flexible and subject to further development. The next step of the process should be self-managed by the National Development Banks, within their decision-making process. Nevertheless, NDBs may require additional support in terms of capacity buildings and trainings by their partner (AFD).
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

During the building process of the MRV system it should be defined how the system will be used in terms of operations and development results. The management team will identify procedures, such as the type of analysis to carry out, whether ex-ante, mid-term or ex-post; whether it should be a single project or group of projects’ analysis allowing to have aggregated results of the projects’ portfolio; how to manage the MRV system in terms of data management; whether to use the tool to improve the accountability in order to get access to public incentives.

Having an MRV system suitable for NDBs’ portfolio of projects and in line with the national context allows the institutions to keep track of the mitigation and adaptation impact of their green credit line portfolio for the projects related to the AFOLU sector.

In particular, the tool shows the advantageous relationship costs/benefits in its implementation within the institutional system and the easiness of use. Some of its strong points are i) the capacity to appraise not only the mitigation and adaptation impact, but also important economic and social aspects of the projects and the general households’ resilience; ii) the possibility to have not only an ex-ante, but also a mid-term and ex-post analysis of the impact of a project or group of projects.

Furthermore, the importance to have a well-structured MRV system, which allows to improve the accountability of a development financial institution in order to have access to public incentives, has been growing nowadays.

With the increasing and diversified access to climate funds, MRV of climate finance will remain an important element in assessing the deployment and general use of climate finance and in strengthening the efficiency and effectiveness, as it will help to gain a better overall understanding of the scale, distribution and use of both public and private support. It will help to show who benefits from financial support and make it possible to identify gaps in regional and sectoral support, for example. It will also help to monitor and evaluate trends and progress in climate-related investment. Finally, MRV of climate finance will account for how scarce public resources are being used and also strengthen public awareness of how taxpayers’ money is used2.

---

2 GIZ, 2014, Measuring, Reporting and Verifying Climate Finance, GIZ Germany
INTRODUCTION

Agriculture, forestry production and land use change (overwhelmingly related to agriculture) represent one quarter of greenhouse gas emissions (GHG) (IPCC, 2014).

Three quarters of the world’s poor population live in rural areas (where 80% of revenue comes from agriculture) and an increase in GDP contributes four times more effectively in reducing poverty when such increase comes from agriculture, than another sector (WB 2007). In this context, small farmers are especially vulnerable to the effects of climate change. If these effects are highly visible on agricultural production, they also impact the rural infrastructure, market access and agricultural financing (making it more risky).

Latin America does not contribute greatly to greenhouse gas emissions (GHG) compared to northern countries, but its contribution is growing due to the increase in energy consumption. Emissions per capita are modest: 3 tonnes CO2-eq per capita in 2004, against 7 in France. The land use changes have a particular weight in Latin American programs, far ahead of other sectors in the subcontinent. However, Country Profiles are highly differentiated between Argentina, for example, which has a developed country profile, Chile, which has a service economy profile and Brazil and Mexico, where agriculture, in the broad sense, (taking into account not only emissions directly related to the production, but also those related to the AFOLU sector) plays a key role in the emissions.

Latin American countries are already observing and experiencing the consequences of climate change. In particular, we note the melting of Andean tropical glaciers, which disrupts flows downstream, reducing the amount of water available for agriculture. Thus changes and variations in precipitation can affect agricultural production. Changes in Pampa’s rainfall is already a sensitive issue, a shift of the isohyets towards the west has increased productivity by facilitating the expansion of soybean cultivation, but at the same time this shift has caused more flooding. Similarly, in the Amazon, the years 2005 and 2010 were exceptionally dry, while in 2009 a major flooding occurred due to extreme rainfall.

The financing of agricultural investment is necessary to increase productivity, improve farm incomes and acquire new assets to cope with climate shocks, allowing improvement of resilience and adaptation to climate change (CC). In general, the development of financial services (credit, savings, insurance) in rural areas allows the establishment of a protective institutional environment that enables people in rural communities to face risks related to climate (decline in agricultural production, e.g. as a result of reduced precipitation or extreme event).

Significant investments are needed to support the global transition to a low-carbon, climate resilient future. Unlocking private sector capital will be essential to achieve large, transformational, and long term impacts across all economies. However, significant questions remain about how to mobilize private investment in climate change activities, how to design risk-return arrangements that attract public and private capital, and ultimately how to align public and private investment incentives (Smallridge D, 2012).

Many investment projects which have "climate co-benefits" in the agricultural and forestry sector are set up by the financial sector of developing countries, particularly by public development banks. National Development Banks are increasingly integrating climate change considerations in their core operations, and are more and more active in financing climate change interventions. It progressively strengthens the role they play in channeling funds towards low-emission projects and programs (Smallridge D, 2012). A recent study from the International Development Finance Club
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

(IDFC) demonstrated that NDBs total green finance commitments in 2014 already amounted to US$ 98 billion mostly devoted to green energy and mitigation of GHG emission reductions (WRI-Ecofys-IDFC, 2015).

We can assist to a growing tendency, in many Latin American countries, towards the development and implementation of green policies, which aims at addressing the issue of climate change. In this framework, financial institutions and national banks in these countries are very active in supporting green projects in the AFOLU sector, within their investment credit line.

In Latin America, many Development Finance Institutions (DFI), have explicitly incorporated the environmental variable within the policies that determine their actions. Some of them are directly supported by AFD through dedicated credit lines and providing them financial support and technical assistance, as it is the case of FIRA in Mexico and Agrobanco in Peru.

However, many of these financial institutions lack i) a strong managerial control of ESG (Environmental, Social and Governance) related risks and ii) a structured and functioning MRV (Measurement, Reporting, and Verification) system in order to track progress of these investments and measure the sustainability of green projects in the AFOLU sector and their impact on climate. For this last point, the design of an appropriate mechanism for MRV, which reduces the complexity and high costs of current systems and is based on easy and accessible data gathering, is a main issue.

It will need to define indicators of climate change (adaptation and mitigation) and a methodology suitable for portfolios of bank financing or project financing funds. Such a system would be very useful to cover portfolios of small projects, in order to contribute to the greening process of the global financial system.

AFD green strategy focuses on promoting the development of renewable energy and clean technologies, involving private sector actors in the fight against climate change, supporting governments and local authorities to implement climate public policies, supporting low-carbon and resilient development in the urban context, protecting ecosystems and supporting agriculture that is less emissive and more resilient to climate change and developing the carbon sequestration potential of forests 3.

AFD is committed to systematically measure the carbon footprint of the projects it finances through a robust and transparent methodology. This provision is included in the AFD operational procedure manual and it includes the construction of an estimate of the carbon footprint of projects earlier in the financing cycle instruction. AFD plays a pioneering role in the international financial institutions and development banks on the issues of carbon footprint measurement and it is the target of several requests for cooperation from other financial institutions of the North and South. It also seeks to better assess the impact of its action on adaptation to climate change. In addition, AFD intends to pursue, in conjunction with its partners and the scientific community, its efforts to harmonize practices and develop indicators and measures enabling a more inclusive appraisal of sometimes complex impacts, useful for evaluating the effectiveness of its action (AFD, 2012).

This study, which targets Mexico, Peru and Colombia, is the result of the joint collaboration between FAO and AFD to build a methodology based on the analysis of bank portfolios or fund projects, in

order to identify indicators of mitigation and adaptation which are simple, solid, inexpensive and suitable for this approach to a portfolio/group of small projects, for the benefit of the institutions of developing countries in Latin America, which are likely to use these methods for their "green" projects in the AFOLU sector.

The present document is composed of two parts: a first bibliographic and inventory work of existing initiatives in the field of MRV applied to financial institutions and development funds in the agricultural and forestry sectors; and a second part, in which the proposed methodology will be widely presented and explained.

This methodology is designed to measure both the impact of mitigation and adaptation projects in the AFOLU sector. Mitigation indicators measure the project's impact on emissions of greenhouse gases, while adaptation indicators measure the reduction of vulnerability of people, livelihoods and ecosystems to climate change. The impact on climate mitigation is reflected through quantitative indicators, derived directly from the EX-ACT tool (Ex-Ante Carbon Balance Tool), developed by FAO. These indicators are used to obtain and analyze the mitigation impacts in terms of tCO2 of the project and also the equivalent economic return, which could be an important aspect to consider when attempting, for example, to access payments for environmental services. The dimension of climate resilience is assessed using simple quantitative but also qualitative indicators. The methodology takes into consideration the three aspects of mitigation, resilience and economic impact.

On 14th December 2015 a peer review was organized at FAO Headquarters in order to present the methodology for MRV of green investment projects for Latin America financial institutions, developed by FAO and the results of the testing method on the projects sample of the credit line of the three institutions in Latin America: FINAGRO in Colombia, AGROBANCO in Peru and FIRA in Mexico. This allowed to stimulate an open discussion among the experts invited and to derive useful advice and inputs for the study.
1. BACKGROUND

1.1 AFD and Latin America Investment Facility (LAIF)

The Agence Française de Développement (AFD) is an international financial institution which operates in the field of Development Cooperation and it is the main French implementing agency which provides assistance to developing countries.

The global objective of AFD is to reduce poverty and inequalities within the framework of the United Nation’s Millennium Development Goals, promote sustainable economic growth, and protect the global environment. This includes the promotion of activities targeted at the fight against climate change; the preservation of biodiversity; the promotion of social and environmental responsibility; as well as provides support to countries weakened by strife, war and natural disasters.

AFD's commitment is focused on providing support to a wide set of projects in different sectors, including rural development, urban infrastructure, transportation, agriculture, education, banking and microfinance, energy, health care, telecommunications, mining, housing and eco-tourism. AFD relies on many partners, such as national, regional and local governments, local authorities and municipalities, international agencies, non-governmental organizations, foundations, private companies, entrepreneurs, local banks, microfinance and capital markets institutions.

Within its financing mechanisms AFD makes use of a wide range of instruments, such as grants, subsidies, guarantees, sovereign and non-sovereign loans, equity shareholdings, co-financing and local bank intermediation, which enable the institution to implement its activities. Moreover, the AFD Group has mobilized important financial instruments on climate action: it has adopted Innovative financial instruments with high leverage on private funding such as: “Green” credit lines and support to local banks and SMEs; guarantees and risk sharing mechanisms (debt funds…); mobilization of EU blending instruments or of the French Global Environment Fund (FFEM). In September 2014, the agency has issued its first climate bonds on the financial market, which is an innovative financing tool to support development projects aimed at fighting climate change.

AFD integrates climate change and development in its operational activity in order to reconcile these two aspects, and aims at maintaining a leading role as a financier of the international fight against climate change. For this reason, it has shaped and adopted a Climate Development strategy for 2012-2016, which goes hand in hand with its development assistance objectives and which is based on three main aspects (AFD, 2012):

i. **A firm commitment to the fight against climate change**, through the allocation of funds specifically addressed to this purpose:
   AFD Group has pledged to reach a high level of “climate” activity for 2012-2016:
   - 50% of AFD’s activity in developing countries;
   - 30% of Proparco’s activity (private sector arm) in developing countries.

ii. **A systematic measurement of the « climate » impact of the projects it finances**, through a robust and transparent methodology. In this context, AFD plays a pioneering role in the international financial institutions and development banks on the issues of carbon footprint measurement and it is the target of several requests for cooperation from other financial institutions of the North and South.

---

Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

iii. A policy of selecting projects according to their climate impacts and the development level of countries, by which AFD commits to not provide funds to strongly emissive projects (AFD, 2012)

AFD green strategy focuses on promoting the development of renewable energy and clean technologies, involving private sector actors in the fight against climate change, supporting governments and local authorities to implement climate public policies, supporting low-carbon and resilient development in the urban context, protecting ecosystems and supporting agriculture that is less emissive and more resilient to climate change and developing the carbon sequestration potential of forests.

AFD strategy of promoting green and inclusive growth in emerging countries allowed the agency to become one of the global leading players on climate action and to contribute to policies implemented by the countries it supports, in order to limit the environmental footprint of rapid growth. Among the various partners, AFD is also collaborating with the European Union that has launched the LAIF Program, an investment fund for Latin America.

The Latin America Investment Facility (LAIF) was officially launched during the EU-LAC Summit in May 2010, by the European Union. It provides a grant which includes hybrid loans, concessional loans, grants, guarantees, equity investments, risk mitigation and technical assistance. The Facility is an innovative financial mechanism that combines grants (non-refundable financial contributions from the European Union) with other resources such as loans from Development Finance Institutions in order to leverage additional financing for development and increase the impact of EU aid.

LAIF sets up partnerships, pooling grant resources from the EU and using them to leverage loans from multilateral and bilateral European Finance Institutions (such as AECID, AFD, EIB, KfW) as well as from regional and multilateral Development Banks (such as CABEI, CAF, IDB). These resources are often being pooled together with contributions from partner countries and beneficiary institutions in Latin America.

LAIF pursues three interconnected strategic objectives:

- Improving interconnectivity between and within Latin American countries via better energy and transport infrastructures, including energy efficiency, renewable energy systems, and sustainable transport and communication networks.
- Increasing environment protection and supporting climate change adaptation and mitigation.
- Promoting equitable and sustainable socio-economic development through the improvement of social service infrastructure and support to SMEs.

Almost all LAIF projects involved at least one European Finance Institution and at least one Latin American Regional Development Bank in Latin America, demonstrating LAIF’s ability to act as a

---

catalyst for concrete EU-Latin America cooperation and its potential for creating constructive synergies.  

1.2 The International Development Finance Club (IDFC)

The International Development Finance Club (IDFC), of which AFD is also part, formed in 2011 and consists of 23 national, bilateral and regional development banks from Africa, Asia, Europe, and Central and South America. This group of international institutions was created based on the belief that the role of development banks is crucial to promote sustainable development and to catalyse the shift towards low carbon and climate-resilient development. The primary objective of the club is to overcome the major obstacles in the long-term development finance by sharing their knowledge and experiences and joining forces on the issues currently defining the global development agenda. With their significant financial capacities, IDFC members committed more than USD 630 billion in 2014 to finance a wide range of projects all over the world. Since 2013, IDFC members have focused their activity on sustainable development, organising working groups on sustainable infrastructure, renewable energy, energy efficiency, social and economic inclusion, sustainable urban development, climate finance, and triangular cooperation.

The lack of an internationally agreed definition of green and climate finance, has led IDFC to work for the creation of a unified definition of such finance and to develop a tracking methodology for reporting climate finance.

Green finance is a broad term that can refer to financial investments flowing into sustainable development projects and initiatives, environmental products, and policies that encourage the development of a more sustainable economy. Green finance includes climate finance but is not limited to it. It also refers to a wider range of ‘other’ environmental objectives, for example industrial pollution control, water sanitation, or biodiversity protection. Mitigation and adaptation finance is specifically related to climate change related activities: mitigation financial flows refer to investments in projects and programs that contribute to reducing or avoiding greenhouse gas emissions (GHGs) whereas adaptation financial flows refer to investments that contribute to reducing the vulnerability of goods and persons to the effects of climate change.

The IDFC “Green finance” is split into three separate categories/themes:

- Clean energy and mitigation of greenhouse gas emissions
- Adaptation to climate change impacts
- Other environmental objectives

Since 2011, the International Development Finance Club (IDFC) has carried out a periodic mapping on green financing by its member banks.

---

7 European Commission, 2015, Latin America Investment Facility (Available at: https://ec.europa.eu/europeaid/sites/devco/files/factsheet-laif_en.pdf)


The Green Finance Mapping is one of IDFC's most important projects, which aims at identifying and categorizing financial flows of IDFC Members to projects in the fields of green energy, adaptation and mitigation of climate change and the reduction of greenhouse gas emissions. This way, the Green Finance Mapping Report offers a transparent view on the activities of IDFC Members and contributes to the improvement of its members’ capacity to track and report on their green finance flows.

While tracking climate finance inputs is critical, there needs to be a greater focus on climate finance outputs, including robust results frameworks and clear methodologies for measuring the effectiveness of climate finance, especially with regard to adaptation.

Climate resilience and adaptation are intrinsically linked to development. This may make it challenging to identify what can be defined solely as adaptation finance, and has resulted in different approaches and methods for tracking and reporting. Recognizing the challenges and the need for comparable approaches, multilateral development banks (MDBs) and IDFC are committing to the development of appropriate initiatives and transparent reporting of methodologies, data and information related to adaptation finance. Therefore, the purpose of the Common Principles for Climate Change Adaptation Finance Tracking is to set out an agreed approach and next steps for tracking adaptation finance.

In 2015, the six large MDBs and the International Development Finance Club (IDFC), have agreed on a common set of principles to track financial commitments both for mitigation and adaptation, based on their respective, group-based climate change adaptation finance tracking and reporting, that help countries prepare for and build resilience to the impacts of climate change. The numbers of the IDFC members participating in the green finance mapping increased from 16 institutions (out of the 19 members) in 2011 to 21 institutions (out of the 23 members) in 2014.

The IDFC Green Finance Mapping for 2014 shows that IDFC significantly contributed, with USD 98 billion of new green finance commitments including USD 85 billion for climate finance commitments, to the world’s fight against climate change toward COP21 in Paris\(^\text{10}\).

1.3 The role of National Development Banks as key actors of climate change

The transformation towards a low-carbon, climate resilient environment requires a great constant amount of funding, which is not always easily provided by the governments alone. This is the reason why the mobilization of private sector investments in climate change mitigation is essential and National Development Banks can play an important role in scaling up private sector investments and help to overcome some of the existing barriers private market will not bear.

Because of their characteristics and their deep knowledge of the national context in which they operate, National Development Banks play a key role in creating the type of financial instruments needed to encourage investment by the private sector and they have the potential to promote market development, creating favourable market structures and provide the necessary financial

instruments to leverage financial resources to mobilize private sector investment in sector programs mitigation.

The majority of climate finance is not distributed directly by governments to end users, but rather through banks and government agencies. Bilateral and multilateral financial institutions play a key role in the distribution of climate finance, accounting for approximately 40% of the total.

NDBs can play a dual role in this context, complementing and catalysing private sector investments. Their great knowledge and consolidated relationship with the local private sector place them in a privileged position to understand local barriers to investment, allowing them to design a financing package tailored to the needs of local investors. In addition to providing financial and non-financial instruments to directly engage the private sector and mobilize it, they can also act as security devices to generate market and investments, providing additional incentives for this sector in order to increase their investment. Compared to commercial banks and investment funds, NDBs have greater potential to take risks that stimulate long-term investments.

There are different types of financial instruments that NDBs can use in order to mobilize climate finance:\footnote{Smallridge D., Buchner B., Trabacchi C. et al., 2013, \textit{El rol de los bancos nacionales de desarrollo en catalizar el financiamiento climático internacional}, BID, New York}

1) Grants: grants can be used for a variety of activities in both the pre-investment stage (for technical assistance or subsidizing insurance premiums) and the investment phase (to lower the interest rate);
2) Tier 1 Loans: they are direct loans in which the NDB takes part or total credit risk of the project’s obligor. In this case the NDB directly provides the credit to a project or a company.
3) Tier 2 Loans: these are granted by NDBs to Financial Institutions (commercial banks or other financial intermediaries), so that they can lend them again. The NDBs take the credit risk of the Local Financial Institution directly, whereas the LFIs assume the credit risk of the project.
4) Guarantee funds to cover part of the risks: many time guarantee funds are brought by the State to incentive the intervention of the NDB in more risky sectors
5) Equity funds: the fund intervenes through a contribution of capital resources in specific companies
6) Funds management: The NDB manages these funds on behalf of the government, given the skills, expertise and reliable systems that enforces

\textbf{1.4 The role of NDBs in the Latin American region.}

Even though the interest towards green finance is growing and the funds to support climate mitigation activities are increasing, the actual financing is not able to cover the existing global needs. A robust and solid commitment from the private sector is essential in order to reach wide, long-term impacts. NDBs have a great potential in promoting the development of the market and shaping the right structures and financial instruments, in order to foster the private sector engagement towards green investments.

Nevertheless, NDBs cannot operate alone, but they need technical and financial support from their own governments. In this regard, not only the role of NDBs should be strengthened, but also governments should provide them specific support actions such as ensuring the necessary resources to develop their internal capacity, providing technical support and capacity building in order to develop green financing lines\footnote{De Olloqui F., 2013, \textit{Bancos públicos de desarrollo: ¿hacia un nuevo paradigma?}, BID}.
Although development banks in the region have made important progress in terms of green finance, it is needed to strongly promote its scaling up, in order to fill in the big gap in finance for climate change mitigation and adaptation in the region, which accounts for US $100 billion. As a matter of fact, according to the study “Greening Development Finance in the Americas” (Yuan F., 2015), development banks operating in Latin America and the Caribbean provide just $ 8.7 billion per year in terms of green finance in general, and climate finance for mitigation and adaptation is just $ 5.9 billion per year. Green finance consists of 20 percent of total development bank financing in LAC. Moreover, thirty-three percent of all development bank finance in LAC is not green.

While there is an effort to set common principles and tracking methodologies among development banks for defining green financial flows on one hand, there is a general lack of a common understanding with regards to monitoring the environmental impacts of green financial flows and setting environmental and social safeguards, on the other hand.

Therefore, in order to improve green financing in LAC, it is important to strengthen the capacity of development banks to invest in green finance, by promoting the creation of “green programs” and “green portfolio” within the banks, by working on a clearer definition, measurement and monitoring of “green finance”; to strengthen the governance of development finance in LAC, by putting in place the proper monitoring systems to evaluate the social and environmental impacts of both green and non-green financial flows; to increase the operational capacity of development banks and to develop and scale up ‘green bond’ programs.

In the Latin American region, Development Finance Institutions are moving ahead on environmental issues. By 2012 there were already twelve Development Finance Institutions (DFI), which had explicitly incorporated the environmental variable within the policies that determine their actions. The adoption of these guidelines and institutional changes associated with their implementation often precede the design of specific financial products. Usually these policies are presented not only taking into account the mandate of their institutions, but also the integration of the promotion of the environment in public policies. This integration and promotion of the environment requires a gradual process, which allows the adaptation of organizational structures and the integration of these concepts in its culture. Furthermore, it is necessary to have clear low-carbon development strategies, coordinated policies, and good coordination among the different stakeholders nationwide. This is why DFIs would need a clear mandate from the governments in this regard, and they should take part in development policy design and planning.

Although several NDBs of LAC are already developing pilot programs using financial instruments and strategies that support climate finance, not everyone is prepared to fulfill this role. Some of them still need support to get actively involved in the financing of climate change.

Among the salient experiences of development and implementation of environmental policies, we can mention the Bank of Economic and Social Development (BNDES, Brazil), Do Banco Brasil, Banco da Amazonia (BASA, Brazil), Banco do Nordeste (BNB, Brazil), the CORFO (CORFO, Chile), the Foreign Trade Bank of Colombia (BANCOLODEX), the Multilateral Investment Bank (BMI, El Salvador), and the Bank of Eastern Republic of Uruguay (BROU), the Banco Promerica in Costa Rica, the Mexican Agricultural Investment Fund (FIRA). The Fund for the financing of the agricultural sector (FINAGRO) in Colombia and the Agricultural Bank of Peru (AGROBANCO).

---


BASA, BANCOLDEX and BROU have anticipated the practices of environmental efficiency within their internal operations as well as the incorporation of environmental criteria in the credit evaluation and management. Furthermore, the BdB, the BNB and BMI have recently implemented financial products aimed specifically at green projects. Finally, BNDES and CORFO, two of the most experienced companies in the environmental area, actively participate in the global initiative against climate change.

1.4.1 Green Financial Products

In the Latin America region, seven national development banks offer green financial products. Under various programs, the areas that these types of loans target can be summarized as follows: clean production technologies; investment in renewable energy, reforestation and industrial recycling. Interest rates and deadlines are backed with resources from international development banks or public funds: the use of these products through soft conditions is encouraged. Since such investments involve greater risk than standard operations, financing in no case exceeds 80% of the required investment.

The Bank of Economic and Social Development in Brazil (BNDES) is one of the most solvent financial institutions development in the region and acts in the environmental area since 1976. However, changes within this organization to incorporate environmental variables have been gradual so that its structure was completed in 2009 and the Environment Area was integrated within their organization. Currently, the BNDES has the largest offer in the region in terms of green financial products. Their credit lines provide different conditions for environmental investments through three forms of financial support: Support for Investment in Environment; Support for Energy Efficiency Projects (Proesco); and Support to Carajás Reforestation (REFLORESTA). The amount of disbursements in these areas during the past ten years, was approximately US $ 230 million. Of that total, about 30% has been paid in the last three years, showing a growing dynamism in the sector.

1.4.2 Participation in the Clean Development Mechanism

A direct application of the FDIs as an instrument of public policy refers to its participation in the initiative against climate change within the framework of the Clean Development Mechanism (CDM). Although the CDM is currently facing challenges and the future of its evolution is still unknown, it allows to finance investments in clean production technologies based on the emission of so-called Certificate of Emission Reductions (CERs). The CER quantified reductions of greenhouse gases, in such a way that the greater the ability of a project to reduce GHG emissions, the more funding it will get. CERs are purchased by governments and companies in industrialized countries, which have signed the Kyoto Protocol. For a project to reach the stage of issuing a CER, it must have previously approved the following phases: a) identification and formulation; b) registration; c) monitoring and verification.

The National and Development Bank in Brazil (BNDES) spent US $ 100 million in 2007 for the creation of the BNDES Clean Development Program. The program encourages the development of the CER market by supporting the creation of the capital of investment funds specialized in these titles. So far, an estimated 125 CDM projects have been indirectly supported.

Also in Brazil, by the end of 2006, the Financing Agency for Studies and Projects (FINEP) implemented the Support to Projects of Clean Development Mechanism Program (Pro CDM). The aim was to finance stages of pre-investment and scientific and technological development of
activities that generate tangible reduction in the emission of greenhouse gases. The supports were in the form of repayable and non-refundable loans, the latter mainly to facilitate partnerships among medium and large enterprises and scientific and technological institutions.

In Chile, the Chilean Economic Development Agency (CORFO) focuses on defining its financing lines with environment public institutions linked to the CDM. Thus, it directs its long-term financing and specific environmental funding to provide financial support to projects with proven potential emission of green titles. By the end of 2009, CORFO has directly and indirectly supported about 80 projects that made up the portfolio of CDM projects in Chile.

Another important fund is the Argentine Carbon Fund (FAC), created in 2005. Its main objective is to promote new investment projects financing the expansion of industrial production capacity, increasing energy efficiency and the replacement of conventional energy by renewable energy sources. Since its creation to date, the fund has made three annual calls and has supported more than 100 projects, of which only 11 reached the stage of registration. The supported projects concern the area of energy, forestry, waste and agriculture.

1.4.3 REDD+ Instruments

Reducing Emissions from Deforestation and Forest Degradation, now commonly known as REDD+, is a potentially significant financial mechanism for shifting the incentives from deforestation and land use change to forest conservation and sustainability. It is a global initiative to help create a financial value for the carbon stored in forests and it offers developing countries incentives to reduce emissions from forest land, while developed countries pay for the carbon that is not released into the atmosphere as a result of forest conservation.

Over two thirds of the world’s potential GHG emissions are in the forests of developing countries, where REDD+ mechanisms, including afforestation, reforestation and forest management, could mitigate 70% of this total. A third of the mitigation potential is located in Latin America & the Caribbean, due to the high rates of deforestation in this region (IPCC, 2007). Latin American forests are critical for reducing carbon emissions and already attract significant context of REDD+.

The REDD+ policy in the region is varied in its level of development. On the one hand it leads to learning opportunities on a national and subnational level. On the other hand it reveals challenges to be overcome.

Concerted efforts, therefore, are essential to not only to preserve standing forests but to support livelihoods, inside and outside of forests.

Among the leading international funds for financing REDD+ activities in tropical countries, there are:

- **UN-REDD** - The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries - The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries was created in 2008 to assist developing countries to prepare and implement a REDD+ mechanism. The UN-REDD Programme is formed

---


Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

Through the expertise of its three participating UN organizations: the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). Twenty-nine countries in Africa, Asia-Pacific and Latin America and the Caribbean are partners of UN-REDD global activities. The main activities of the UN-REDD Programme are to support countries to prepare national REDD+ strategies, build monitoring systems, engage stakeholders and assess multiple benefits. The UN-REDD programme also assists countries in the preparation of their public policies and legislations in order to develop a REDD+ programme.

- **FCPF - The Forest Carbon Partnership Facility** - The Forest Carbon Partnership Facility, launched in June 2008, is a global partnership that works on the national level demonstrating how REDD+ can be applied in tropical countries, complementing UNFCCC negotiations, demonstrating how REDD+ might be implemented at country level, learning the lessons of the initial phase of implementation. The FCPF assists 37 countries with tropical and subtropical forests in the readiness process for REDD+, developing the systems of financial incentives for REDD+ policies, and implementing pilot activities. The FCPF has a national approach to REDD+ in order to avoid the risk of “leakage” of deforestation and forest degradation. In Latin American and the Caribbean, the FCPF is working with 15 countries.

- **Amazon Fund** - The Amazon Fund was created in 2008, after Norway’s donation of 700 million Norwegian kroner, approximately US$110 million. The fund’s objective is to prevent and combat deforestation and to enhance the sustainable use of the Amazon biome. In addition, 20% of the Amazon Fund resources can be assigned to different forest areas in Brazil and to other tropical countries in the Amazon basin. BNDES, the Brazilian Development Bank, is the agency responsible for managing the Amazon Fund. The fund’s resources are voluntary donations, primarily from countries, but they can also come from NGOs, private sector, individuals and multilateral institutions.

- **FIP - The Forest Investment Program** - The Forest Investment Program is a targeted program of the Strategic Climate Fund, one of two funds within the framework of the Climate Investment Funds. The FIP supports developing countries’ efforts to reduce deforestation and forest degradation and promotes sustainable forest management that leads to emission reductions and the protection of carbon reservoirs. It achieves this by providing scaled-up financing to developing countries for preparing reforms and public and private investments, identified through national REDD readiness or equivalent strategies. In Latin American and the Caribbean, the FIP as of 2011 had three pilot countries: Brazil, Mexico, and Peru.

1.5 **The National Development Banks targeted by the MRV methodology**

In the following part, the three cases of agricultural banks in Latin America, which the present study targets and which include elements of climate financing, will be briefly presented. The proposed methodology has been retargeted and rephrased to fit with the MRV needs of these three development Banks. A more comprehensive report of the countries object of the study and of the pilot testing experiences can be found later in the text.

---

FINAGRO – Colombia

FINAGRO is a second tier bank which provides financing to first tier banks such as Banco Agrario and private banks. Through this mechanism, farmers can access funding under preferential interest rates.

The rural agricultural credit is granted to be used in different stages of production of agricultural, aquaculture and fishery goods, its primary processing and/or marketing, as well as to mining, rural and ecological tourism, crafts, processing and marketing of metals and precious stones.

FINAGRO seeks to address the issue of lack of incentives of the financial sector in order to place credit resources in the agricultural sector, given the high risk that this productive activity entails. With these resources FINAGRO manages to grant discounted resources to finance productive projects in the sector, across multiple financial intermediaries.¹⁸

FINAGRO is creating very important opportunities for the future of rural microfinance in Colombia through the recently created Rural Microfinance Fund (FMR), which is currently in the implementation phase and whose aim is to promote the use of green microfinance.¹⁹

The Forestry Incentive Certificate – CIF is the result of the agreement between FINAGRO and the Colombian State, through the Ministry of Agriculture and Rural Development, which recognizes the positive externalities of commercial reforestation because of the environmental and social benefits generated. Its purpose is to promote direct investments for new forest plantations, which are protective and productive, on lands suitable for forestry. The Forestry Incentive Certificate is the document issued by the competent authority for the management and administration of renewable natural resources and environment, which entitles the beneficiary to obtain directly and only once, the fixed amount of money by the bank that has been authorized for this purpose by FINAGRO.

AGROBANCO – Perú

Agrobanco is the main instrument of state financial support for the sustainable and continuous development of the agricultural sector, with special emphasis on agriculture, livestock, forestry, aquaculture, agro-industrial activities and the transformation processes, marketing and export of natural products and derivatives of such activities.

Agrobanco relies on 100 million soles (approximately US$ 31 million) from the Treasury. Although the bank is not providing credit to the forestry sector, during the recent electoral competition, the winning party presented, as one of its main proposals, the significant increase in funding for this institution and has also expressed a willingness to channel resources to the forest sector, having recently approved the expansion of bank capital to 260 million of soles (approximately US$ 81 million).²⁰

Among its services, it’s worthy to mention the Forest Credit. This credit is intended to finance the acquisition of new machinery to allow better use and processing of wood of Tahuamanu region. The objective of this program is to contribute to the financing of the sustainable use of forest,

---

demonstrating the value of the existing timber potential, through loans granted to producers with concessions according to Law No. 27308 - Law of Forestry and Wild Fauna; to contribute to the protection of the Amazon forest and of the biodiversity with rational management; to encourage the increase in the employment of local labor, ensuring higher incomes²¹.

**FIRA – Mexico**

FIRA is part of the Mexican financial system of the Development Bank. It operates as a second-tier entity and it channels resources to the field through financial intermediaries. It focuses on small farmers through support in credit and collateral, training, technical assistance and technology transfer.

FIRA has developed strategies for developing sustainable projects that have the design and innovation of green financial products, for people in rural communities. At the same time, recognizes and prioritizes low-cost credits for building and strengthening productive infrastructure, as well as for investing in projects of sustainable agriculture that protect biodiversity, water and energy efficiency, and renewable energy. FIRA also promotes formal access to finance among producers and companies of the agriculture, forestry, fisheries and rural sectors, and provides financial resources for the development of projects that benefit the environment and contribute to climate change mitigation. With FIRA support, companies and producers have been able to better organize themselves as borrowers, reinforce their businesses, improve market linkages, gain access to alternative energy sources and implement sustainable production technologies.

FIRA has a range of products and services with programs that encourage the development of activities aimed at improving the environment, mainly through mitigation of greenhouse gases. Examples of programs and their objectives are described below:

- FIRA offers support with funding and guarantees for the installation of biodigesters. It gives finances up to 80% of the project, it offers institutional guarantee (50%-80%), and it makes use of the Green FONAGA guarantee and of FIRA special programs. In the Program for the Treatment of Animal Waste (AW PoA), they support installation of biodigesters to provide a system for treatment of waste produced by livestock activity in the country (mainly pork and dairy cattle), in order to capture and take advantage of methane to produce electricity.
- FIRA also offers a preferential access to international bond carbon markets through the BioCarbon program, which gives solutions for obtaining carbon credits, in a safer, easier and faster way, facilitating producers to include their projects in international markets.

FIRA has established strategic alliances with several national and international specialized partners as the United Nations Environment Program (UNEP) and its Finance Initiative (UNEP-FI) to capitalize on their expertise in the development of long term sustainable projects, while improving its knowledge about environment issues (Smallridge D, 2012).

---

2. AGRICULTURAL INVESTMENT PROJECTS AND THEIR IMPACT ON MITIGATION AND ADAPTATION

Adaptation and mitigation are two different concepts. Mitigation to Climate Change is a human intervention to reduce the sources or enhance the sinks of greenhouse gases. The goal of mitigation is to “stabilize greenhouse gas levels in a timeframe sufficient to allow ecosystems to adapt naturally to climate change, ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.” 22 Are examples of mitigation, those initiatives that avoid dangerous human interference with the climate system, and that promote the protection of natural carbon sinks like forests and oceans, or creating new sinks through silviculture or green agriculture.

Climate adaptation refers to the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damage, to take advantage of opportunities, or to cope with the consequences. The IPCC defines adaptation as the, “adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation.” 23

Adaptation seeks to lower the risks posed by the consequences of climatic changes. The goal is to reduce our vulnerability to the harmful effects of climate change (like sea-level encroachment, more intense extreme weather events or food insecurity).

While adaptation actions are necessary in the short-term for limiting potential risks of the unavoidable climate change damages, mitigation actions are necessary for limiting climate change damages in the long-term by reducing anthropogenic emissions or by enhancing carbon sinks.

Importantly, there are also significant differences in the policy nature underlying adaptation and mitigation actions. The benefits of adaptation choices will be realized almost immediately but will matter most under moderate climate change, perhaps up to about mid-century. By contrast, benefits of mitigation may only be realized decades from now, becoming relevant towards the end of the century. 24

Resilience is the ability of people, communities or systems that are confronted by disasters or crises to withstand damage and to recover from them in a timely, efficient and sustainable manner. This includes protecting, restoring and improving food and agricultural systems under threats that impact food and nutrition security, agriculture, and food safety/public health. 25

In order to understand the possible effects that investments projects can have on GHG sinks and sources and the impact of mitigation and adaptation practices, it is important to consider the

---


different project components and activities. Knowing the different aspects of climate change and the options for mitigation and adaptation will allow for well-informed decision-making by farmers, policymakers and practitioners.

The following chapter will show how climate investment projects in the agricultural and forestry sector can have an impact on climate mitigation and adaptation. For this purpose, a set of mitigation and adaptation options will be presented hereby, and suggestions on GHG effects, that might need to be considered in order to improve climate resilience, will be highlighted.

### 2.1 Agricultural Mitigation options

**Annual crop management:** Project activities to improve crop production are quite diverse, and may have diverse impacts on GHG sinks and sources. Sustainable land management practices (e.g., changes in crop type or variety, nutrient management, water management, crop residue management, tillage practices) may have direct effects on soil carbon stocks. They may also directly affect \( \text{N}_2\text{O} \) emissions from organic manure or synthetic fertilizers, by increasing nitrogen use efficiency and reducing emissions to the environment. Where crop residues are burned, improved management of crop residues may reduce \( \text{N}_2\text{O} \) and \( \text{CH}_4 \) emissions from burning and also increase soil carbon stocks. In wet rice production systems, the main source of GHG emissions is \( \text{CH}_4 \), which may be affected by changing irrigation practices. Agroforestry practices may also directly affect woody biomass carbon pools.

Some cropland management practices may increase project emissions, for example if use of synthetic fertilizers, agricultural machinery or pumped irrigation water is increased. Energy used in irrigation pumping will either cause direct emissions (e.g., if diesel pumps are used) or indirect emissions (e.g., if electricity is the main energy source), and it may be determined whether off-site emissions in production of electricity and other agricultural inputs are included in the scope of the GHG assessment.

**Grassland and livestock management:** Grasslands and other grazing lands are very diverse, both in their initial vegetation types and in their responses to management practices. Where grassy vegetation is dominant, improved management or restoration may primarily be expected to impact on soil carbon pools. Where bushes or trees are common, the main impacts may be on woody biomass carbon pools. Changes in livestock density will affect \( \text{CH}_4 \) emissions from enteric fermentation and \( \text{N}_2\text{O} \) and \( \text{CH}_4 \) emissions from manure deposited on pasture. Improved availability and quality of forage after adoption of improved grassland management, or improved livestock management and feeding practices, may also affect \( \text{CH}_4 \) emissions from livestock enteric fermentation.

However, in extensively grazed systems, because of low livestock densities, these effects may be relatively small. In intensive livestock systems, improved livestock management and feeding practices may affect both \( \text{CH}_4 \) emissions from enteric fermentation and \( \text{N}_2\text{O} \) and \( \text{CH}_4 \) emissions from manure management, especially if manure management systems change (e.g., with a shift from grazing to stall-fed systems). Where animal dung is an energy source, change in grazing or manure management practices may also have direct effects on household energy use. Changes in fodder and feed production on-farm will affect direct GHG emissions from land use and crop cultivation.

---


27 For additional information, see [http://www.fao.org/docrep/013/i1880e/i1880e00.htm](http://www.fao.org/docrep/013/i1880e/i1880e00.htm)
### Table: Main direct GHG effects of common types of activity promoted by AFOLU projects

<table>
<thead>
<tr>
<th>Types of activity promoted by AFOLU projects</th>
<th>Main carbon pools and GHG sources directly affected</th>
<th>Main GHGs directly affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 Reduction in rate of deforestation</td>
<td>Above- and below-ground woody biomass carbon; forest soil carbon</td>
<td>CO₂</td>
</tr>
<tr>
<td>A2 Reduction in forest degradation</td>
<td>Above- and below-ground woody biomass carbon</td>
<td>CO₂</td>
</tr>
<tr>
<td>A3 Adoption of improved cropland management</td>
<td>Soil carbon</td>
<td>CO₂</td>
</tr>
<tr>
<td>A4 Introduction of renewable energy and energy saving technologies</td>
<td>Fuel combustion, wood or animal manure used in energy production</td>
<td>CO₂ (CH₄ and N₂O for animal dung)</td>
</tr>
<tr>
<td>B1 Improved animal production</td>
<td>Enteric fermentation</td>
<td>CH₄</td>
</tr>
<tr>
<td>B2 Improved management of livestock waste</td>
<td>Livestock waste management, replaced energy sources</td>
<td>CH₄ and N₂O (CO₂ for replaced energy sources)</td>
</tr>
<tr>
<td>B3 More efficient management of irrigation water in rice</td>
<td>Anaerobic decomposition of organic material in flooded rice paddies</td>
<td>CH₄</td>
</tr>
<tr>
<td>B4 Improved nutrient management</td>
<td>Nitrogen nutrients in fertilizer</td>
<td>N₂O</td>
</tr>
<tr>
<td>C1 Conservation farming practices</td>
<td>Soil carbon</td>
<td>CO₂</td>
</tr>
<tr>
<td>C2 Improved forest management practices</td>
<td>Above- and below-ground woody biomass carbon</td>
<td>CO₂</td>
</tr>
<tr>
<td>C3 Afforestation and reforestation</td>
<td>Above- and below-ground woody biomass carbon; forest soil carbon</td>
<td>CO₂</td>
</tr>
<tr>
<td>C4 Adoption of agroforestry</td>
<td>Above- and below-ground woody biomass carbon</td>
<td>CO₂</td>
</tr>
<tr>
<td>C5 Improved grassland management</td>
<td>Soil carbon</td>
<td>CO₂</td>
</tr>
<tr>
<td>C6 Restoration of degraded land</td>
<td>Soil carbon</td>
<td>CO₂</td>
</tr>
<tr>
<td>D1 Increased livestock production</td>
<td>Enteric fermentation</td>
<td>CH₄</td>
</tr>
<tr>
<td>D2 Increased irrigated rice production</td>
<td>Anaerobic decomposition of organic material in flooded rice paddies</td>
<td>CH₄</td>
</tr>
<tr>
<td>D3 Increased fertilizer use</td>
<td>Nitrogen nutrients in fertilizer</td>
<td>N₂O</td>
</tr>
<tr>
<td>D4 Production, transport, storage and provision of agricultural chemicals</td>
<td>Fuel combustion and energy use</td>
<td>CO₂</td>
</tr>
<tr>
<td>D5 Increased electricity consumption</td>
<td>Fuel combustion</td>
<td>CO₂</td>
</tr>
<tr>
<td>D6 Increased fuel consumption</td>
<td>Fuel combustion</td>
<td>CO₂</td>
</tr>
<tr>
<td>D7 Installation of irrigation systems</td>
<td>Fuel combustion and energy use, embodied emissions in cement or steel production</td>
<td>CO₂</td>
</tr>
<tr>
<td>D8 Building other infrastructure</td>
<td>Fuel combustion and energy use, embodied emissions in cement or steel production</td>
<td>CO₂</td>
</tr>
<tr>
<td>E1 Timber logging</td>
<td>Above- and below-ground woody biomass carbon</td>
<td>CO₂</td>
</tr>
<tr>
<td>E2 Cropland expansion</td>
<td>Above- and below-ground woody biomass carbon in forest</td>
<td>CO₂</td>
</tr>
<tr>
<td>E3 change in crop residue management</td>
<td>Soil carbon</td>
<td>CO₂</td>
</tr>
</tbody>
</table>

---

Perennial crops and agroforestry: Trees in agricultural systems, whether perennial crops or other agroforestry systems, may be expected to primarily have direct effects on woody biomass carbon pools, but soil carbon pools may also be affected.29 Perennial tree crops are often intercropped with other crops or vegetation, and project activities to improve perennial tree crop management may also impact on the crop structure and management of accompanying crops, having direct effects on related GHG sinks and sources. Project activities to expand the area under perennial tree crops may involve biomass burning for clearing, causing N\textsubscript{2}O and CH\textsubscript{4} emissions, and displacing prior agricultural activities (e.g., annual crops, livestock grazing), potentially causing leakage emissions. Agroforestry systems closely integrate trees with crop production, and agroforestry activities may affect annual crop management.

Project activities to reduce deforestation and forest degradation: In general, activities to reduce deforestation and forest degradation may be expected to primarily have direct effects on forest carbon pools (i.e., above- and below-ground woody biomass, litter and dead wood, soil carbon, non-tree vegetation and harvested wood products). Depending on site-specific conditions, the main GHG effects may be expected to be on above- and below-ground woody biomass.30 If forest fires are a major issue in the project region, project activities to reduce the occurrence of forest fires may also directly affect N\textsubscript{2}O and CH\textsubscript{4} emissions from biomass burning. Globally, agriculture is the main proximate driver of most deforestation.31 In some regions, commercial agriculture is the most important driver, while in others subsistence agriculture is the main driver. Commercial timber extraction and logging are responsible for forest degradation and deforestation in some areas, while in others fuel wood collection, charcoal production and possibly also livestock grazing in forests are important drivers of deforestation and degradation.

Afforestation and reforestation: In general, afforestation and reforestation activities may be expected to primarily have direct effects on forest carbon pools (i.e., above- and below-ground woody biomass, litter and dead wood, soil carbon and non-tree vegetation).32 Depending on site-specific conditions, the main GHG effects may be expected to be on above- and below-ground woody biomass. Afforestation and reforestation will most likely affect land use in the targeted sites, and may induce land use change. Direct effects of land use change may include loss of biomass carbon in vegetation existing prior to afforestation or reforestation. Land clearing by biomass burning may also cause N\textsubscript{2}O and CH\textsubscript{4} emissions. Other consequential effects may include land use change outside the newly planted forest locations, such as leakage emissions due to displacement of prior land uses (e.g., livestock grazing, fuel wood collection, timber harvesting or agricultural production).33

Forest management: Project activities to support sustainable forest management, change practices or harvest regimes or other forest management activities may be expected to primarily have direct effects on forest carbon pools (i.e., above- and below-ground woody biomass, litter and

---

29 For additional information, see e.g. http://library.uniteddiversity.coop/Permaculture/Agroforestry/Carbon_Sequestration_Potential_of_Agroforestry_Systems-Opportunities_and_Challenges.pdf and http://worldcocoafoundation.org/wp-content/files-mf/somarriba2013environmentsustainabilityagroforestrycarbon.pdf

30 For additional information, see e.g. http://theredddesk.org/sites/default/files/resources/pdf/Module%20EF-D.%20Emissions%20Factors%20for%20Deforestation.pdf


32 For additional information, see e.g. https://cdm.unfccc.int/filestorage/e/t/extfile-20140929185122152-draft-field-manual.pdf/draft-field-manual.pdf?u=b2J8bnIrAWZ6IDCH7SEc0QL3wuZSSSURReD2P

33 For additional information on leakage, see e.g. https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-15-v2.0.pdf
dead wood, soil carbon, non-tree vegetation, and harvested wood products). Community-based forest management initiatives may also affect prior forest uses, such as fuel wood collection, charcoal production, livestock grazing, timber harvesting or agricultural production.

**Infrastructure:** Improvements in agricultural infrastructure are often critical components of initiatives to support agricultural and rural development. Construction of roads, buildings and facilities and irrigation systems all involve direct emissions from energy use by machinery in the construction process, and also cause indirect emissions in the production of cement, steel and other inputs to the construction process. It should be determined whether these indirect effects should be included in the scope of GHG assessment.

**Agribusiness support:** Support to agribusiness is an important type of intervention to support the development of commercial agriculture. Investments in agribusiness that increase processing capacity may increase total energy use by project beneficiaries, while investment in more efficient technologies in existing firms may reduce energy consumption. Fuel and energy use are likely to be the main direct emissions affected by project activities supporting agribusiness development. Support to agro-processing may cause changes in agricultural production practices among suppliers and thus consequential GHG emissions, and vice versa, support to agricultural production may also cause increased consequential GHG emissions from product transport, storage and processing by agri-businesses, either as intended or unintended project effects.

In agriculture, Climate Smart Agriculture is emerging as an approach to simultaneously address three intertwined challenges: ensuring food security through increased productivity and income, adapting to climate change, and contributing to climate change mitigation. Climate-smart agriculture aims to improve food security, strengthen resilience to climate change, and reduce greenhouse gas (GHG) emissions by promoting adoption of appropriate practices, developing an enabling policy and institutional environment and mobilizing finance. Because of the close interactions between land uses, climate-smart agriculture should be implemented through a landscape approach that enables the integrated management of agricultural systems and the natural resources that support ecosystem services affecting all land use sectors. Many options for climate-smart agriculture also reduce GHG emissions per unit land area or per unit of agricultural product or increase carbon stocks in the landscape, and thus contribute to mitigating climate change.

### 2.2 Agricultural Climate Adaptation and Resilience Options

Regarding the adaptation and resilience practices which contribute to the resilience to climate change shocks, we will present hereby a list of different options, taken from guidances on “Resilient adaptation to climate change”, and a recent FAO ESA methodological Working document “Climate Resilience Assessment of Agriculture and Forestry Projects and Programmes (CRAAF)” developed by Professor Speranza of University of Bonn, for appraising the incremental capacity of resilience generated by projects. Due to the wide range of adaptation options, it is important to evaluate these in order to determine which adaptation actions should be promoted or implemented under specific circumstances (Dolan et al. 2001). In the following paragraphs, a series of different management practices to face climate change are presented.

---

34 For additional information, see various methodologies at [http://www.v-c-s.org/methodologies/find](http://www.v-c-s.org/methodologies/find)


**Water-linked management practices**

**Adaptation of rainwater management practices:** Since climate change will result in increased frequencies of extreme events (droughts, cyclones, floods), and higher rainfall variability in terms of time, space and amounts, a potential adaptation measure would be to secure water availability for crop and livestock production.

One way of doing this is to harvest rainwater and runoff. At a first glance, inadequate water supply is a major challenge to agro-pastoral systems. In this line, three examples of technics are provided below:

- *Sand dams* trap sand during flooding thereby blocking extra sub-surface water in the sand bed and thus increases available water for harvesting in dry times.
- *Micro-catchments water harvesting techniques* (contour bunds) are used for planting crops and trees.
- *Rainwater harvesting for crop and livestock production* is an old farm management technology that is being re-examined due to its potential to address climate change impacts through stabilising on-farm water supply.

**Adaptation of irrigation management practices:** In the absence of water or under conditions of increased rainfall variability due to climate change, irrigation of crops from rivers, lakes and shallow groundwater offer opportunities for adaptation to climate change.

**Adaptation of soil management practices**

The most limiting input in dryland farming is soil water. Climate change will affect soils by changing soil climate (moisture content, temperature) and affecting soil chemical processes, soil fauna and flora.

Adaptation of soil management to climate change will entail:

- *increasing the infiltration capacity of the soil*.
- *increasing water holding capacity*.
- *improving soil structure and conditions for soil fauna and flora*, thereby increasing natural soil fertility.

Depending on the magnitude of soil degradation, *prevention, reduction and rehabilitation measures* can be implemented. Prevention implies use of Soil and Water Conservation (SWC) measures that maintain natural resources and their environmental and productive function on land that may be prone to degradation:

- *Conservation tillage / Zero-tillage* is practiced in many dryland areas and entails the minimisation of soil disturbance and exposure by reducing tillage and using crop residues to cover the soil. Conservation tillage also increases the retention of soil water, improves soil structure and biotic activity, reduces soil loss and increases soil fertility.
- *Mulching*, that is using plant residue to cover soils and that way facilitate their incorporation during tillage into the soils as organic matter (soil organic carbon) is another way to improve soil resilience to climate change.
- *Organic manure and composts* are intended to improve soil fertility and simultaneously enhance soil structure (against compaction and crusting) and improve water infiltration and percolation. Studies show that soils with high humus content contribute to increased crop yields.
- *Terracing* controls run-off down a hillside and depending on where it is practiced can increase soil water storage or enhance drainage in areas of excess rainfall.
Adaptation of crop management practices

Crop management practices affect soil health, soil structure, soil nutrient content and soil climate, and can serve as an adaptation strategy to climate change:

- **Crop rotations** (temporal diversity) and **mixed cropping** (within field diversity): well managed and synchronised.
- **Crop rotations** (for example, growing green manure legumes as fallow crops) help revitalise the soil and reduce the persistence and spread of crop pests and diseases.
- **Switching to other/high value crops** is one form of adapting to climate change provided the crop is tolerant to heat or to dry conditions.
- **Fallowing** entails non-cultivation of arable lands for a certain period with the aim to restore soil fertility. This can be in terms of bush fallows or improved falls. Since the soil surface is covered by the crops, soil loss is reduced and soil structure improved. Improved fallowing can be in form of **green manure**, that is, plants grown for the purpose of reinvigorating the soil, either to use them as manure or for mulching.
- **Biologically fixed nitrogen from legumes (green manure)** can be used to adapt to climate change. By growing nitrogen fixing crops, soil fertility can be increased without causing emissions as is the case when using inorganic fertilizers.
- **Alley cropping** increases nutrient cycling through increased total biomass production with or without fertilizer. Alley cropping can improve nutrient cycling whereby nitrogen-fixing trees are planted in parallel rows to crops. Through alley cropping, biomass production can also be increased. Food crops are then planted in between the rows in the “alley” while the trees protect the soil from erosion and fix nitrogen in the soil.
- **Use of organic pesticides and insecticides** to address uncommon pests and diseases.

Agro-forestry and reforestation as an adaptation measure

Tree management practices can reduce the effects of climate change on the ecosystem by increasing ground cover, improving soil structure and infiltration, decreasing erosion by water and wind. Water erosion, especially under extreme rainfall conditions and in already degraded land is a major hazard:

- **Indigenous and improved agro-forestry**, that is, the cultivation of trees with crops, pastures or livestock, can address many challenges that farmers face in a variable climate. Agro-forestry can be another way to reduce competition on the use of crop residues for fodder, mulching and burning. If trees planted can provide fodder for livestock, farmers may be more willing to leave the residues to cover the soil after harvests. Planting trees between crops can help prevent soil erosion, restore soil fertility, and provide shade for other crops.
- **Shelterbelts and windbreaks**, that is, trees planted to block or reduce wind speeds, also maintain soil moisture and reduce evaporation.
- **Live fences**, that is, trees planted around homesteads or cultivated land, aim to protect the enclosure from roaming livestock and in many cases to provide fodder for livestock.
- **Reforestation** is another way to adapt to climate change impacts. By reforesting, degraded land is put into new use thereby offering the local communities access to forest resources.

Adaptation of livestock, pasture and rangeland management practices

Climate change will adversely affect pastures and rangelands. Improving the management of livestock production is thus a proposed strategy. Improved management of grazing lands relates to changing control and regulation of grazing pressure. This can be achieved through initial reduction of the grazing intensity through fencing, followed either by rotational grazing, or ‘cut-and-carry’ of fodder, and vegetation improvement and changes in management.
• **Fodder substitution** addresses fodder shortage. An adaptation to climate change would be to ensure fodder availability for livestock, which can be achieved through fodder banks.
• Grazing and fodder lands can also be conserved through *reforestation, enclosures and zero grazing*.

**Climate Resilience options**

Resilience is relative because it depends on interactions between factors and their outcomes. Resilience assessment thus also raises the issue of context specificity as socio-ecological conditions are dynamic in time and space. Since the aim is not to have a single measure of climate resilience but to be able to judge if and in what dimensions a project might contribute to climate resilience, all the resilience dimensions have to be taken into consideration.

Professor Speranza in her study: “*Climate Resilience Assessment of Agriculture and Forestry Projects and Programmes (CRAAF)*”, identifies three characteristic dimensions of resilience (Figure 1): Buffer capacity; Self-organisation; Capacity for learning. The three dimensions of resilience are further decomposed into indicators and sub-indicators (Figure 2).

---

Speranza I. C., Bockel L., 2015, *Climate Resilience Assessment of Agriculture and Forestry Projects and Programmes (CRAAF)* – An Expert Assessment Tool, Centre for Development and Environment, University of Bern, FAO.
a) **Climatic hazards**

As climate change manifests in multi-faceted ways in specific social-ecological contexts, it is important to determine from the outset which climatic hazards or climate-related hazards are prevalent in the project area and by extension examining to what extent the project is likely to contribute to improving climate resilience in regard to the specific climatic hazards (draught, floods, etc.). An additional aspect to access is the extent the proposed project or programme is climate-proof.

b) **Main components of the agricultural system**

Generally, an agricultural system can be distinguished into 3 main components: The watershed and landscape level, the plot/enterprise (crop-livestock) level and the operational unit (household) level, which for small-scale agriculture is mostly a household. Analysing the contributions of projects to the climate resilience at the watershed and landscape level thus entails asking questions about how the project improves the capacity of the watershed to maintain its functions, for example of sequestering carbon through vegetation, storing water or regulating run-off. Similarly at the plot/enterprise level, livestock and crop conditions, prevalence of crop and livestock diseases as well as other production factors and agronomy are important. At the operational unit level (household), understanding the baseline conditions, for example, in terms of household food availability, income levels, work burden are important for gauging the likely contribution of a project to climate resilience.

c) **Institutional and regulatory environment**

Literature shows that governments have the critical role and duty to foster an enabling environment through adequate policy support and regulation. Thus institutional arrangements (policies, laws and regulations) and socio-political contexts determine to a large extent if farmers or pastoralists have the opportunity in the first place to initiate the practices. To examine the extent to which the institutional arrangements of a target area foster or are likely to foster resilience-building measures the question is: To what extent do government policies, laws and regulations as well as strategic plans address an indicator variable.

To operationalize the livelihood resilience framework for a multi criteria qualitative ex-ante appraisal of projects and national agricultural plans, the resilience framework has been decomposed into questions.

The major question is to what extent the intervention has built or improved climate resilience at the following levels:

1. Buffer capacity of the watershed/landscape
2. Buffer capacity of the household
3. Buffer capacity of crop-livestock production
4. Self-organisation of households
5. Capacity to learn of the households

Figure 3: Resilience dimensions and assessment
3. CAPITALIZATION OF EXPERIENCES OF MRV METHODS ON AFOLU INVESTMENT PROJECTS

This capitalization work is based on reviewing a set of practical and technical guides and tools developed between 2008 and 2015 as part of the monitoring and evaluation of the impacts of agricultural projects on mitigation of climate change, and resilience. The analysed material comes from the UNFCCC, ODI, GCF, FAO, IFAD, the World Bank, the CGIAR (CIAT, CCAFS), OECD, GTZ, EU, ADB, and other technical agencies.

The adaptation and mitigation of climate change has acquired a central position in government priorities and gradually considered as an essential aspect of any investment decision. As such, it is necessary to estimate the impact of any public investment project in terms of co-benefit or externality on the adaptability and mitigation of climate change. The rapid rise of climate funds and their rational use in the financing of public and private development investments demand a rigorous monitoring and evaluation of impacts both to ensure that the expected benefits of these actions are realized and to better guide investments.

3.1 Definition: a notification system for monitoring and verification (MRV) of the impact of climate-related projects

Monitoring refers to the systematic collection of data on pre-defined project or programme indicators. It enables the stakeholders involved to check whether an initiative is on track in achieving set objectives.

MRV is not a new concept and has been widely used in many contexts at national and international levels to ensure transparency and help in effective implementation of a given activity. In simple terms with regards to the implementation of projects, it is defined as:

- Measurement: collect relevant information on progress and impacts
- Reporting: present the measured information in a transparent and standardised manner
- Verification: assess the completeness, consistency and reliability of the reported information through appropriate fact based review

Measurement enables assessment of the implementation of plans, the achievement of objectives/goals and the taking any necessary corrective steps that may be required. Reporting and verification ensure communication of consistent and reliable information to appropriate authorities in order to facilitate assessment. MRV is thus a management tool for monitoring achievement of goals and objectives, whether they are of an organization, an institution or part of the governance of a country. Governments typically use MRV to measure a number of economic, social and environmental indicators to enable objective assessment of progress in meeting national development goals as well as the effectiveness of policies, programs and regulations.

Governments also use MRV as a tool for accountability to their constituents. An important aspect of accountability is documentation of benefits of the actual policies and actions deployed and cost-effectiveness of the measures. Such documentation provides governments, budget departments, funding agencies and implementation bodies with the information needed to make objective decisions as well as feedback to improve decision making and implementation strategies.
Monitoring, intended as measurement and reporting, is a continuous or periodic function that uses systematic collection of data, qualitative and quantitative, for the purposes of keeping activities on track. It is first and foremost a management instrument.

MRV should be used during different timeframes: 1) ex ante; 2) mid-term; 3) ex-post. Monitoring may take place on different levels:

- **Project and program level**—mainly of implementation processes, including the tracking of activities and financial resources;
- **Portfolio level**—mainly of trends in implementation, outputs, outcomes, and progress toward their achievement; and including the monitoring of focal area portfolios, country portfolios, Agency portfolios;
- **National and global level**

A good monitoring system combines information from various levels—corporate, portfolio, and project or program—in such a way that it provides a comprehensive picture of performance and allows periodic reports to management that facilitate decision making and learning.

Aside from being an international requirement under the UNFCCC, MRV of mitigation actions is also an important management tool for countries to use to track their progress in moving to a low-emission development path and in achieving sustainable development goals.

MRV systems also provide lessons learned, strengthen national GHG data quality, help identify national priorities, challenges and future opportunities and demonstrate emission reductions to donors.

MRV elements ensure transparency, consistency, comparability, completeness, and accuracy of information with regard to:

- Recognition and visibility of mitigation achievements
- Attribution of quantified impacts to policies
- Accounting of national and international progress
- Identification of gaps and support needs
- Creation of access to public and private finance.

A core component of MRV is the selection of concise and measurable indicators. The judicious use of indicators is considered to be an important part of monitoring and evaluation efforts since they represent a powerful tool both to reduce the complexity of system description and to integrate complex system information. Moreover, MRV methods need to be cost effective and easy to apply so that they can be used in developing countries where accurate information, and capacity, may be constrained.

Indicators should be specific, measurable, achievable, relevant, and time-bound, characteristics that are denoted by the acronym SMART:

- **Specific**. The system captures the essence of the desired result by clearly and directly relating to the achievement of an objective and only that objective.
- **Measurable**. The monitoring system and indicators are unambiguously specified so that all parties agree on what they cover and there are practical ways to measure them.
- **Achievable and Attributable**. The system identifies what changes are anticipated as a result of the intervention and whether the results are realistic. Attribution requires that changes in the targeted developmental issue can be linked to the intervention.
- **Relevant and Realistic**. The system establishes levels of performance that are likely to be achieved in a practical manner and that reflect the expectations of stakeholders.
3.2 Guiding Principles derived from practical experiences

Effective climate funds will progressively be managed at country level, with national ownership of plans, government staff closely involved in implementation and direct access to funds for countries with the capacity to plan and implement responses to climate change. In this perspective, many countries are initiating their own National Climate Fund to support adaptation and mitigation investments in different sectors as energy, infrastructure, agriculture and forestry (AFOLU), food security and social safety.

The different approaches used by the agencies – particularly in the context of climate adaptation - to monitor the progress of the projects in terms of climate change mitigation and adaptation, raise the question of whether to use detailed indicators corresponding to every component of a project or if a more aggregate measure that captures reduction in overall climate vulnerability is preferable. Having a limited set of similar aggregate indicators contributes to comparability of interventions and to aggregation of impact performance (Lamhauge N et al, 2012).

The analysis that is presented in the annex allows to have an overview of the systems and types of indicators used by different programs and institutions to monitor the progress of the projects in terms of climate change mitigation and adaptation.

<table>
<thead>
<tr>
<th>Text Box 1: GHG mitigation benefit calculation and reporting requirements of selected institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Environment Facility (GEF): Since 2011, full- and medium-size GEF projects have been required to use a climate change mitigation tracking tool to report on the GHG mitigation benefits of GEF projects. Manuals for calculating GHG mitigation benefits of projects in the energy and transport sectors have been issued. In 2014-15, a review was conducted of the GEF’s policies and guidance, and recommendations for GHG quantification in the AFOLU sector were made.</td>
</tr>
<tr>
<td>International Finance Institutions (IFIs): There are currently 12 IFIs which have been working together to agree a harmonised approach to project-level greenhouse gas (GHG) accounting. The rationale for this work is to harmonize GHG accounting during project appraisal. They</td>
</tr>
</tbody>
</table>


defined a common approach to GHG Accounting for renewable energy, energy efficiency and transport projects. A number of other IFIs have been estimating the GHG emission reduction impact of energy sector projects, but assessment for other sectors is less common. Some international development institutions have also developed related policies.

United Nations Development Programme (UNDP): Since 2015, the Social and Environmental Standards of UNDP requires screening of all projects above US$ 500,000, and projects with emissions of more than 25,000 tCO₂e per annum are deemed ‘high risk’, may require in-depth social and environmental impact assessment, and emissions must be tracked and reported in accordance with IPCC estimation methodologies.

World Bank: The World Bank’s environment strategy, issued in 2012, commits to analyse the GHG emissions of investment projects financed by IDA/IBRD. Ex ante quantification of emissions and emission reductions for energy and forestry projects began in 2013, for agriculture in 2014, and transport, water and urban sector projects will begin in 2015. Guidance notes on how to meet calculation and reporting requirements in these sectors have been drafted.

The European Bank for Reconstruction and Development (EBRD): EBRD’s Environmental and Social Policy mandates that clients provide the data necessary for GHG assessment for projects with expected emissions exceeding 100,000 tCO₂e per annum. Reportedly, almost all projects are screened for their GHG impact during the project assessment phase. A set of Guidance Notes have been produced to assist consultants and staff in completing these requirements.

European Investment Bank (EIB): In 2014, the EIB completed a 3-year pilot carbon footprinting initiative and has now released guidelines for estimating the gross emissions and emission reductions of financed projects. Ex ante assessment is required for projects expected to produce gross emissions of more than 100,000 tCO₂e per annum or a relative change in emissions of more than 20,000 tCO₂e per annum.

Sources: Climate Investment Funds (2014) Greenhouse Gas Analysis and Harmonization of Methodology (CIF/TFC.14/Inf.2); UNDP (2014) Social and Environmental Standards

Among the set of indicators used in the experiences screened for this report, we have selected indicators which fit with the following criteria: (i) indicators which are more suitable for a monitoring at the level of portfolio, or at the level of project assessment; (ii) indicators which are easy to access and to measure versus longer lists of specific and more complex indicators; (iii) indicators which can be used to provide ex-ante, mid-term or ex-post monitoring analysis.

Among the different cases that have been analyzed, a common feature that can be found in the majority of them, is the development of an approach which is based on aggregated indicators which can measure the overall impact performance at the level of the investment portfolio.

This is the case of the ASAP program by IFAD, with 10 indicators which enable aggregation of data generated by the supported projects. A list and a short analysis of the 10 indicators is provided in annex 2. The program has also a wide range of project-specific sub-indicators which can be useful in order to get information on particular key areas, such as gender impacts.

In the case of the Pilot Program for Climate Resilience (PPCR), which is described in the annex 5, the program has developed 11 indicators, five of which are core indicators measured at the level of investment plan. These core indicators allow country results to be aggregated and synthetized. The remaining 6 optional indicators as well as country and project specific other indicators may be used depending on the country’s specific needs and requirements.
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

These core indicators are typically a sort of complex indicators which require a qualitative appraisal and which are not suitable for the object of the present study on simple indicators suitable for the global context of national development banks.

In the Adaptation Fund indicators, which are presented in more detail in annex 6, there is a greater explicit emphasis on the impacts of adaptation on populations and the systems on which they depend (e.g. ecosystems, health systems, infrastructure), assessed through quantitative indicators referring to factors such as numbers of projects, numbers of institutions targeted/affected by interventions, number of adaptation actions taken, and number of assets strengthened. The Adaptation Fund (AF) addresses also vulnerability and resilience of populations through three indicators: percentage of households with more secure access to livelihood assets, percentage of population with sustained climate-resilient livelihoods and number of households with more secure access to livelihood assets.

The AF also has five core indicators, which allow the Fund to aggregate quantitative indicators for a diverse portfolio (including agriculture, water management, coastal management, rural development, food security, Disaster Risk Reduction, among others).

The GEF – AMAT (Adaptation Monitoring and Assessment Tool) is the first GEF tracking tool for climate change adaptation projects in the framework of LDCF/SCCF (Least Developed Countries Fund/Special Climate Change Fund). It provides 14 useful generic indicators for adaptation projects, which represent a balance between comprehensiveness and ease of use (see annex 8 for a more exhaustive description). The tool is focused on quantitative data and it is restricted to ensure the consistent use of each indicator and unit of measurement, in order to facilitate the collection, aggregation and communication of progress and outcomes across a large number of projects and programs.

**Text Box 2: The GEF Climate Change Mitigation Tracking Tool**

The Global Environment Facility has decided that all projects endorsed by the Chief Executive Officer after December 2010 must use a climate change mitigation tracking tool. Projects are required to report expected climate change effects upon submission for endorsement, at mid-term evaluation and at terminal evaluation.

A Climate Change Mitigation Tracking Tool has been developed to simplify and standardize the reporting process. The tool facilitates reporting of lifetime GHG emissions avoided due to investments during the project implementation period, lifetime post-project emissions avoided due to financial facilities put in place by a GEF project, and lifetime GHG emissions avoided attributable to long-term changes in the enabling environment due to the GEF project.

For AFOLU projects, users can input data on the number of hectares of forest or non-forest land under protection or improved management. They can indicate whether the project supports interventions to promote good management practices, whether carbon stock monitoring systems are established in the project, and they can derive quantitative estimates of lifetime GHG emissions avoided and carbon sequestration effects. These indications of project outcomes and GHG effects are reported along with data on finance from GEF and other sources at key stages in the project lifetime, enabling management to track individual project effects and to aggregate the effects of multiple projects for reporting on progress in relation to the programmatic objectives stated in the GEF Results Framework.
**GHG quantification methodologies** have been adopted for transport, energy efficiency and renewable energy projects in order to standardize procedures for estimation of GHG effects. A recent consultation also recommended development of a standardized methodology for AFOLU projects. This present guidance document takes account of key recommendations presented to the GEF Council.

**Sources:** [https://www.thegef.org/gef/tracking_tool_CCM](https://www.thegef.org/gef/tracking_tool_CCM); [https://www.thegef.org/gef/ghg-accounting](https://www.thegef.org/gef/ghg-accounting)

On the other hand, there are indicators which allow a monitoring at the level of project assessment. It is the case of the GEF-Landscape Carbon MRV System, which is an online tool for GEF project managers to implement and manage a project-level monitoring and evaluation effort to directly measure the carbon benefits resulting from a GEF funded natural resources project (annex 7). It is applicable for sustainable land management projects.

The system allows for multiple levels of data availability and data input requirements. The tool can be used to produce reports of ex-ante or ex-post carbon stocks and greenhouse gas emissions within their project areas and the core indicators are related to forest land cover and carbon stocks.

Another case of monitoring of performance was used in Madagascar, as part of the research done by FAO and the *Institut de Recherche pour le Développement* (IRD) on testing a methodology to simultaneously appraise the multiple benefits of Climate Smart Agriculture (CSA) and agroecology success stories in terms of incremental income, mitigation and climate resilience at plot level. More details can be found in the annex 3.

The appraisal methodology is based on a series of micro level interviews with farmers to appraise the effective cost-benefit of CSA / agroecology at plot level. Comparing the performance of both, CSA / agroecology practices and conventional practices before project implementation, enables to quantify the impact of CSA / agroecology. Surveys are designed to provide multiple-benefit performance indicators analysing simultaneously (1) the pro-poor impact (farm income), (2) climate resilience impacts (assets and income shocks) and (3) mitigation impacts.

Another element which emerges from the analysis of different types of MRV systems, is the importance to incorporate climate risk information, connected to climate risk management, into vulnerability assessment, as an overall approach to project management and monitoring and evaluation. The IIED, for example, proposes an approach which combines assessment of how well climate risks to development are managed by institutions with assessment of how successful adaptation interventions are in reducing vulnerability and keeping development on track. This approach allows at showing whether and how the adaptation needs of poor groups are addressed and what safeguards are in place to prevent maladaptation.

In the framework of project design, as an ex-ante analysis, the IIED suggests that high level qualitative intermediate indicators to capture transformative outcomes and impacts are required. In the annex 4 it is mentioned, as an example, indicators on policy levers which give incentives for low carbon, climate resilient action by governments, private sector and civil society, and indicators of increased climate foresight in planning by governments. This element allows to understand the capacity of institutions, government and civil society to comprehend climate change and to integrate adaptation into decision making. The approach set out here enables adaptation to be evaluated at the level of institutions and governance.
An important aspect to be taken into consideration in order to develop an efficient MRV system, is the clarity and accessibility of the indicators and their aptitude to data collection and aggregation.

In TCI Guidance document “Incorporating climate change considerations into agricultural investment programs”, mentioned in annex 10, FAO emphasizes the importance to integrate climate change-related indicators in agricultural investment projects or programs. However, it presents a very long and wide list of over 60 detailed indicators, which generate many practical application issues on data availability because they are too specific and not easy to capture.

The ESA FAO study on resilience check by Ifejika Speranza (annex 11), is looking at different types and levels of resilience. This study aims at presenting specific resilience indicators, according to the different dimensions covered by resilience. The general goal is to provide an assessment framework that can be used to analyse the contribution of projects to climate resilience of agriculture-based livelihoods and agricultural landscapes. A multi-criteria indicator framework has been proposed by the study of Ifejika Speranza to assess the contributions of projects in agriculture and forestry ex-ante to climate resilience. Three characteristic dimensions of resilience are identified: Buffer capacity; Self-organisation; Learning capacity. These three dimensions of resilience are further decomposed into simple qualitative indicators and sub-indicators to be answered by project developers. It is designed to be adapted in country situations and to fit with information availability at project design level.

This leads us to the conclusion that, it is necessary to derive indicators, which are simple, cost-effective, easy to appraise and to measure at field level in order to clearly track the progress of a project or program, or to better plan it ex-ante in all its activities impact, and to facilitate data collection.

The more complex the identification and measurement of the indicators, the more incomplete and inefficient the MRV will be and the more difficulties this creates to have access to climate funds.

### 3.3 Towards a MRV system suitable for agricultural investment projects

In order to credit and finance development projects, which contribute to mitigation and adaptation, it is necessary to have a system of MRV that ensures that mitigation benefits actually are achieved. MRV is a key issue in assessing the potential for linking mitigation benefits to smallholder agricultural systems, since they involve significant costs and they affect the uncertainty factors and risk associated with any specific action. MRV systems are needed to ensure environmental and social integrity of mitigation actions.

There is a wide spectrum of possible sources and mechanisms for crediting and financing mitigation, ranging from public funded policies to offset crediting mechanisms—and these also entail a range of MRV options. There is considerable discussion in the UNFCCC process about the MRV required for different approaches, and this has been a key issue in accepting agricultural mitigation as a source of mitigation eligible for crediting and financing—particularly in the context of carbon markets. At present there is considerable interest in exploring the possibility of scaled-up approaches for crediting – at sectoral and sub-sectoral level – due to the high transactions costs and relatively little development of project-based approaches.\(^{42}\)

---

Besides these questions it is essential to create a robust and comprehensive MRV system for climate finance. This needs to be reliable, but also cost effective and easy to apply in developing countries. It needs to ensure that the systems in place really contribute to climate change mitigation and adaptation objectives as well as development objectives, both at international level and at national and sub-national level.

The proposed methodology of an MRV system, which will be widely presented in the second section of this study, derives its framework from lessons learned and indicators used in the different applications appraised and reviewed in this paper.
4. PROPOSED METHOD OF ANALYSIS AND MONITORING OF CLIMATE IMPACT OF BANK PROJECTS

4.1 Basic principles

At this stage of progress of the monitoring, reporting and verification process of the impacts of investment projects on mitigation and resilience to climate change, a series of good practices and recommendations based on the experience will follow, giving access to a series of recurring indicators, operating principles, analysis modalities and aggregation procedures. The proposed indicators are associated with methods of collection and structured analysis in an Excel file that constitutes an MRV tool designed to simplify the analysis and follow-up by project and aggregation. The file includes a module on Project Data, a module on carbon footprint analysis and a module on MRV Results which combines all results.

This proposed methodology is a first analytical framework on possible mitigation, adaptation and resilience indicators to include in a monitoring system for investment projects in the agricultural sector. It is based on the need for simple mitigation, adaptation and resilience indicators, easy to collect and to aggregate, which develop a measurable and concrete tracking system, in order to develop an accurate assessment of the impact of agricultural investments.

It should have a set of mitigation indicators directly derived from quick GHG accounting appraisal done through a simplified EX-ACT based tool providing results at project level (carbon balance), performance per ha and performance per beneficiary, both per year and for the whole project. It should also provide economic / value figures of the benefit generated allowing to link results with options of project funding, project subsidy options linked with national climate funds or payments for environmental services. Such indicators should be designed to allow at aggregating them for a portfolio of projects.

The Ex-ante appraisal of climate adaptation impact should target the incremental resilience generated by projects. Existing methods combine very global quantitative indicators as number of beneficiaries with improved Climate resilience capacity or number of ha with improved resilience to climate shocks and use of set of qualitative indicators to estimate the potential of a project/programme to build resilience, through contributing to the various dimensions of resilience. Resilience does not derive from one indicator. As such the relative strengths of the resilience dimensions depends on the social-ecological (including political) framing conditions. While buffer capacity largely captures farmers’ endowments and access to various capitals, self-organisation and learning include more process-like and practice-like indicators, capturing the agency of the farmers in building resilience. The aim of such resilience appraisal is to judge if and in what dimensions a project might contribute to increase climate resilience of beneficiaries.

4.2 Quantitative Indicators of carbon effects

This methodology is based on the idea of measuring both the impact of mitigation and adaptation generated by the AFOLU projects. Mitigation indicators measure the project’s impact on emissions of greenhouse gases, while adaptation indicators measure the reduction of vulnerability of people, livelihoods and ecosystems to climate change.
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

The impact on the mitigation of climate change is reflected through the following quantitative indicators, derived directly from the EX-ACT tool:

i. Tons of carbon dioxide equivalent (t CO2 equivalent) reduced or avoided (including increased removals) over 20 years;
ii. Mitigation impact in tCO2 per year;
iii. Mitigation impact per year per ha;
iv. Project cost per ton of CO2 equivalent reduced;
v. Equivalent value of the impact of mitigation per year (30 US $ / tCO2);
vi. Equivalent value of the impact of mitigation per year per ha (30 US $ / tCO2);
vii. Carbon footprint per ton of production

These indicators allow to obtain and analyze mitigating impacts in terms of the project and also tCO2 equivalent economic return, which could be an important aspect to consider when seeking, for example, the access to payments for environmental services.

In EXACT MRV tool, these mitigation indicators appear as follows:

<table>
<thead>
<tr>
<th>Climate Mitigation dimension of the project(s)</th>
<th>Tonnes of carbon dioxide equivalent (t CO2eq) emitted (+) / reduced or avoided (-) on 20 years</th>
<th>GHG impact per year in TCO2</th>
<th>Mitigation impact per year per ha</th>
<th>Equivalent project cost per Ton of CO2 reduced</th>
<th>Equivalent value of mitigation impact per year (US$ 30/TCO2)</th>
<th>Equivalent value of mitigation impact per year per ha (US$ 30/TCO2)</th>
<th>Carbon footprint per ton of production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate Mitigation dimension of the project(s)</td>
<td>30,220</td>
<td>1,511</td>
<td>167.89</td>
<td>0.00</td>
<td>0.00</td>
<td>0.48</td>
<td></td>
</tr>
</tbody>
</table>

### 4.3 Quantitative Indicators of Resilience to Climate Change

EX-ACT Quantitative appraisal allows also at deriving some quantitative indicators for resilience generated either in terms of areas or households benefiting from increased resilience:

i. Increase of hectares of land managed through resilient practices to climate change;
ii. Hectares with improved coverage of trees and vegetation (reduction of landslides and erosion, flood resistance);
iii. Hectares with enhanced carbon content in the soil (resilience to drought and erosion reduction);
iv. Number of households benefiting from improved resilience of watersheds and land to climate shocks;
v. Number of households benefiting from improved resilience of farming systems;
vi. Number of households benefiting from improved physical, social, financial capital;
vii. Number of households benefiting from improved self-organization and learning abilities.

In EXACT MRV tool, these resilience indicators appear as follows:

<table>
<thead>
<tr>
<th>Climate Resilience dimension of project(s)</th>
<th>Increase in hectares of land managed under climate-resilient practices</th>
<th>Number of hectares with improved tree and vegetal coverage (land slide, flood resilience)</th>
<th>Number of hectares with increased soil carbon (drought and erosion resilience)</th>
<th>Number of HH having become more climate resilient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate Resilience dimension of project(s)</td>
<td>5 ha</td>
<td>0 ha</td>
<td>5 ha</td>
<td>1 HH</td>
</tr>
</tbody>
</table>
4.4 Qualitative analysis of resilience factors: Global Incremental Resilience Index (GIRI)

A more thorough assessment of the adaptation is based on a multi-criteria analysis of different dimensions of resilience issued from a FAO methodical study work (Chinwe Ifejika Speranza). The three identified resilience dimensions are: buffer capacity; self-organization; learning capacity. These three dimensions of resilience are based on a series of indicators deducted from the project profile. The buffer capacity differs in the three levels of analysis in which an agricultural system can be identified: watershed / area level, households parcel level / agro-pastoral production.

Consequently, the resilience index is based on five resilience factors:

i. buffer capacity of the watershed, landscape and project area;
ii. The absorption capacity of climatic shocks of production systems;
iii. The absorption capacity of climatic shocks on household food security;
iv. Strengthening the self-organizing ability of households after the project;
v. Improving the learning capacity of households following the project.

A general index derived from these factors, gives a first estimate of the climate resilience generated by the project, which is measured as very high, high, medium, low, very low.

To assess the impact of the project on each of these resilience factors, different criteria are used. Every factor is measured through a set of specific qualitative criteria to be answered. For instance, to assess buffer capacity of the watershed, the landscape and the project area, a series of seven questions are proposed: (i) To what extent does the project improve land cover? (e.g. agroforestry, cover crops etc.), (ii) To what extent does the project reduce soil erosion?, (iii) To what extent does the project improve soil conditions (e.g. soil moisture, soil structure etc.)?, (iv) To what extent does the project improve efficient use of water?; (v) To what extent does the project save water?, (vi) To what extent the project area is protected from climate shocks, (vii) To what extent the project infrastructure - building investments are climate-proof. The complete detail-list of questions is provided in the tables of data entry provided in chapter 5.7.

4.5 Performance indicators on income and resources (water, energy)

In addition, complementary indicators on income, employment generated and on other environmental aspects are also included in the result set, as we can see from the table below.

<table>
<thead>
<tr>
<th>Income performance of project</th>
<th>742500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total incremental income generated</td>
<td>US$/ year</td>
</tr>
<tr>
<td>Average income per ha</td>
<td>82500 US$/Ha</td>
</tr>
<tr>
<td>Average incremental income per Household</td>
<td>742500 US$/HH</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other environmental performances</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of water consumption reduced per year</td>
<td>-5400 M3/ year</td>
</tr>
<tr>
<td>Renewable energy capacity installed</td>
<td>0 MW/ year</td>
</tr>
<tr>
<td>employment generated</td>
<td>144 Addit. Jobs created</td>
</tr>
</tbody>
</table>
5. Modalities of Data Entry and Analysis on EX-ACT MRV Tool

Project data entry for appraising mitigation impact will use the following screens of project data entry format derived from the EX-ACT software. It constitutes a simplified data entry format for mostly small public and private investment projects appraised in tier 1 with a baseline scenario considered as constant (no change).

This should allow to immediately appraise a small investment project, once data entry is completed on the project data module (30 minutes is the estimated time required for entering this information; it can be done by either the designer of the project or the investment manager).

5.1 Entering general data: Project, climate, soil, financing

The first data required to be entered concern general information regarding the project, such as the country, region and duration of implementation and a set of indicators, such as climate, moisture regime and dominant regional soil type, which are needed in order to contextualize the project and to put the basis for the impact calculation.

5.2 Filling land use change data

In the following screenshot, the data entering regarding land use change is presented. Land use change in terms of affected area with hectares and initial and final use must be filled in. In «other land use change» fire use in plant residues can also be specified.
5.3 Entering agricultural activities data: annual crops, perennial and rice

For the EX-ACT sub-module on annual crops, it is essential to differentiate between the following improved practices, which contribute to fix carbon in the soil:

- Improved agronomic practices comprise all practices that may increase yields and thus generate higher quantities of crop residues. Examples of such practices reported by Smith et al. (2007) are the use of improved crop varieties, extending crop rotations, and rotations with legume crops.
- Improved nutrient management includes the application of fertilizer, manure or biosolids in a way that improves either efficiency (adjusting application rate, improving timing and location) or diminishes the potential losses (forms of fertilizer with slow release rate or nitrification inhibitors).
- Improved tillage and residue management comprises the adoption of tillage practices of less intensity ranging from minimum tillage to no-tillage. It may include or not include mulching of crop residues and thus also comprises a key element of conservation agriculture.
- Enhanced water management consists of enhanced irrigation measures that can lead to an increase in productivity and hence augment the quantity of residues.
- Manure application: Manure or Biosolids application to the field as input.
5.4 Entering Livestock and Grassland Management data

For the grassland module users collect data on the size and state of degradation of grassland, the grass yield, practices of grassland burning and the time dynamic of changes in the degradation state of the respective grassland area. The livestock part of the module requires information on the type and number of livestock and the percentage of herds that receive improved feeding practices, dietary additives that reduce CH4 emissions (Ionophores, vaccines, bST, etc.) or are subject to improved breeding practices.

Information on livestock emissions may be refined by specifying the mean annual temperature as well as regional specific values for the emissions of CH4 and N2O from manure management and the CH4 emissions from enteric fermentation.
5.5 Entering inputs and Investments data

The following screenshot presents the module concerning additional data on the inputs used and energy consumptions. This section allows to calculate the GHG emissions associated with the production, storage, transport and transfer of agricultural chemicals and the ones associated with electricity and fuel consumption. In the last part, data regarding the installation of irrigation systems and infrastructure consumption can also be entered.
5.6 Entering other data required for MRV

Other data concerning aquaculture, water use efficiency, renewable energy and income and labour generated can be included for the analysis, if needed.

<table>
<thead>
<tr>
<th>Other data required for MRV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aquaculture</strong></td>
</tr>
<tr>
<td>Additional Tons of Fish produced per year</td>
</tr>
<tr>
<td><strong>Water use efficiency</strong></td>
</tr>
<tr>
<td>Volume of water consumption reduced per year</td>
</tr>
<tr>
<td><strong>Fossil Energy use reduction</strong></td>
</tr>
<tr>
<td>Renewable energy capacity installed</td>
</tr>
<tr>
<td><strong>Additional Income generated</strong></td>
</tr>
<tr>
<td><strong>Banana</strong></td>
</tr>
<tr>
<td>specify agriculture product</td>
</tr>
<tr>
<td>specify livestock income</td>
</tr>
<tr>
<td>specify other Household additional incomes</td>
</tr>
<tr>
<td><strong>Additional Labour generated</strong></td>
</tr>
<tr>
<td>Additional Labour</td>
</tr>
</tbody>
</table>

5.7 Filling the series of qualitative resilience criteria

The resilience index is based on five resilience factors: (i) increased buffer capacity of the watershed, landscape and project area; (ii) buffer capacity of crop-livestock production systems; (iii) buffer capacity of household in relation to food security; (iv) Strengthening the self-organizing ability of households after the project; (v) Improving the learning capacity of households following the project. A general index derived from these factors, gives a first estimate of the climate resilience generated by the project, measured as very high, high, medium, low, or very low. To assess the impact of the project on each of these resilience factors, the specific criteria used are listed below:

<table>
<thead>
<tr>
<th>Buffer capacity of watershed and landscape and project area</th>
<th>Expert group Assessment (0-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 To what extent does the project improve land cover? (e.g. agroforestry, cover crops etc.)</td>
<td>0</td>
</tr>
<tr>
<td>2 To what extent does the project reduce soil erosion?</td>
<td>0</td>
</tr>
<tr>
<td>3 To what extent does the project improve soil conditions (e.g. soil moisture, soil structure etc.)?</td>
<td>0</td>
</tr>
<tr>
<td>4 To what extent does the project improve efficient use of water?</td>
<td>0</td>
</tr>
<tr>
<td>5 To what extent does the project save water?</td>
<td>0</td>
</tr>
<tr>
<td>6 To what extent the project area is protected from climate shocks</td>
<td>0</td>
</tr>
<tr>
<td>7 To what extend the project infrastructure - building investments are climate-proof</td>
<td>0</td>
</tr>
</tbody>
</table>

Sub-Result | 0

It should be filled by either the team of project design or the team in charge of project implementation. In case of midterm or ex-post evaluation, it could be managed through a
participatory appraisal involving beneficiaries or representatives or beneficiaries and other implementing partners.

### Buffer capacity of crop – livestock production

<table>
<thead>
<tr>
<th>8</th>
<th>To what extent does the project reduce crop failure?</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>To what extent does the project improve resistance of crops to pests and diseases?</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>To what extent does the project improve resistance of livestock to pests and diseases? (e.g. through vaccination)</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>To what extent does the project reduce post-harvest losses?</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>To what extent does the project increase practice of mixed cropping/intercropping?</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>To what extent does the project promote on-farm diversity (annuals/perennials, mixed cropping, mixed farm enterprise e.g. livestock-crop)?</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>To what extent does the project reduce (crop/livestock) yield variability?</td>
<td>0</td>
</tr>
</tbody>
</table>

Sub-Result: 0

### Buffer capacity of households in relation to food security

| 15 | To what extent does the project improve household food availability (e.g. through increased household food production or improved household access to food)? | 0 |
| 16 | To what extent does the project improve household food storage | 0 |
| 17 | To what extent does the project improve household income? | 0 |
| 18 | To what extent does the project increase agricultural production physical assets? | 0 |
| 19 | To what extent does the project improve access of households to agricultural inputs? | 0 |
| 20 | To what extent does the project support (existing or new) farmer groups and networks? | 0 |
| 21 | To what extent does the project increase agricultural skills? | 0 |
| 22 | To what extent does the project improve access of households to climate-related social safety nets (e.g. climate-index agriculture insurance, cash, vouchers, warehouse receipt systems etc.)? | 0 |

Sub-Result: 0

### Self-organisation of households

| 23 | To what extent does the project improve cooperation and networks of farmers (e.g. farmer groups, farmer field schools, farmer organisations etc.)? | 0 |
| 24 | To what extent does the project collaborate with national/sub-national farmer/pastoralist organisations (capacity of farmers/pastoralists to influence decisions)? | 0 |
| 25 | To what extent does the project support farmer-networks across scales (e.g. local farmer groups being connected to national farmer organisations; bridging/linking social capital)? | 0 |
| 26 | To what extent are farmers actively participating in the project? | 0 |
| 27 | To what extent does the project foster good governance (keeping of records; accounting for exclusion, elite capture and corruption) in farmer cooperation and networks? | 0 |
| 28 | To what extent does the project improve farmer skills to manage groups? | 0 |
| 29 | To what extent does the project link agriculture value chains? | 0 |
| 30 | On-farm reliance: To what extent does the project build on local knowledge? | 0 |

Sub-Result: 0

Such criteria are mostly fact-based or action-based to facilitate the answers. They target the content of project actions, project support and specific straight-answer-oriented project aspects.
5.8 Set of impact results provided by investment project

5.8.1 Multi-impact Summarized results per project

Project impact results are provided as multi-impact report summarized in one-page excel sheet as follows in the EX-ACT - MRV Tool:

<table>
<thead>
<tr>
<th>Learning capacity of households</th>
<th>0-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>To what extent does the project improve farmer knowledge of threats and opportunities to agricultural production (e.g. climate specific awareness programmes)?</td>
<td>0</td>
</tr>
<tr>
<td>To what extent does the project improve access to extension services?</td>
<td>0</td>
</tr>
<tr>
<td>To what extent does the project improve farmer/pastoralist experimentation (e.g. through farmer/pastoralists field schools, climate field schools, exchange visits)?</td>
<td>0</td>
</tr>
<tr>
<td>To what extent does the project improve access to climate information (e.g. seasonal forecasts adapted for agriculture, workshops)?</td>
<td>0</td>
</tr>
<tr>
<td>To what extent does the project improve access to market information?</td>
<td>0</td>
</tr>
<tr>
<td>To what extent does the project improve access to communication networks (e.g. mobile networking, radio programmes)?</td>
<td>0</td>
</tr>
</tbody>
</table>

Sub-Result

0
5.8.2 Detailed results of GHG impact per project

In the following screenshot, the detailed set of GHG results by module is extracted from the EX-ACT MRV tool as a central output of the analysis. It allows to understand both emission sources and mitigation main areas.

<table>
<thead>
<tr>
<th>Project Name</th>
<th>ggg</th>
<th>Climate</th>
<th>Tropical (Wet)</th>
<th>Dominant Regional Soil Type</th>
<th>LAC Soils</th>
<th>Duration of the Project (Years)</th>
<th>20</th>
<th>Total area (ha)</th>
<th>2</th>
<th>Budget (US$)</th>
<th>17235.63</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Components of the project</th>
<th>Gross fluxes</th>
<th>Share per GHG of the Balance</th>
<th>Result per year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without</td>
<td>With</td>
<td></td>
</tr>
<tr>
<td>All GHG in tCO2eq</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive = source / negative = sink</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Land use changes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deforestation</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Afforestation</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other LUC</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Agriculture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual</td>
<td>25</td>
<td>-112</td>
<td>-137</td>
</tr>
<tr>
<td>Perennial</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rice</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grassland &amp; Livestocks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grassland</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Livestocks</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Degradation &amp; Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inputs &amp; Investments</td>
<td>0</td>
<td>182</td>
<td>182</td>
</tr>
<tr>
<td>Other (aquaculture...)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>70</td>
<td>45</td>
</tr>
<tr>
<td>Per hectare</td>
<td>13</td>
<td>35</td>
<td>22</td>
</tr>
<tr>
<td>Per hectare per year</td>
<td>0.6</td>
<td>1.8</td>
<td>1.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fluxes per component</th>
<th>Balance per component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without</td>
<td>With</td>
</tr>
<tr>
<td>CO2-Biomass</td>
<td>0</td>
</tr>
<tr>
<td>CO2-Soil</td>
<td>0</td>
</tr>
<tr>
<td>CO2-Other</td>
<td>0</td>
</tr>
<tr>
<td>N2O</td>
<td>0</td>
</tr>
<tr>
<td>CH4</td>
<td>0</td>
</tr>
<tr>
<td>Project Name</td>
<td>ggg</td>
</tr>
</tbody>
</table>

5.8.3 Modalities of aggregation by investment bank projects portfolio

Every appraised project will use the same EXCEL format saved as project file. Sets of project indicators could be switched from EX-ACT files to ACCESS or EXCEL portfolio Database. Such portfolio management still needs to be discussed with Development Banks to assess which cumulated indicators they would expect.
6. COUNTRIES REPORT ON AGROBANCO, FIRA AND FINAGRO AND LESONS LEARNED

In the following chapter, the three case studies of agricultural banks in Latin America, FINAGRO in Colombia, AGROBANCO in Peru and FIRA in Mexico, will be presented and analysed. For each country, the lessons learned from the pilot testing experiences of the methodology as a result of the study and the missions undertaken in the three countries, will be showed.

During the first field visit each national context has been analyzed and the banks’ profile has been detected. In this framework, the methodology has been presented and subsequently refined and adapted to the individual context. The second mission allowed a wider and more precise presentation of the tool and a better understanding of the methodology thanks to a training provided to the national development banks. During these trainings, a set of projects, part of the NDBs’ portfolio have been appraised and the methodology has been tested and retargeted within the development banks, in order to better suit the contexts and the NDBs’ needs.

As the chapter will show, Agrobanco is the most advanced among the three development banks, in terms of support to green projects, having a well-structured green credit line implemented within its portfolio.

6.1 Case study: AGROBANCO – Perú

Agrobanco is the main instrument of state financial support for the sustainable development of the agricultural sector, with special emphasis on agriculture, livestock, forestry, aquaculture, agro-industrial activities and the transformation processes, marketing and export of natural products coming from such activities.

It was created in 2001, through the Law Ley N° 27603 and in 2010, through the Law N° 29626, the ownership of the shares for Agrobanco were transferred to FONAFE, the National Financing Fund for the commercial activity of the State. It is a state-owned company under private law, of mixed economy with the State, through FONAFE, as the owner of 100% of the capital.

Agrobanco relies on 100 million soles (approximately US $ 31 million) from the Treasury. Although the bank is not providing credit to the forestry sector, during the recent electoral competition, the winning party presented, as one of its main proposals, the significant increase in funding for this institution and has also expressed a willingness to channel resources to the forest sector, having recently approved the expansion of bank capital to S/. 260 million (approximately US $ 81 million)\(^{43}\). It is present in the whole country with a network of 81 agencies.

A total of 54, 799 clients (64% of the portfolio) are exclusive customers, who manage their production business only with the financial support of Agrobanco. 89% of the customers served by the bank belong to medium and extreme levels of poverty. This is why the bank is present in special areas where micro and small agriculture prevails. The significant presence of customers in the jungle and highlands regions stands out, which represents 84% of the total nationwide. Promoting the association of small and mid-size producers is one of the bank’s main objectives. In that respect it is important to take into consideration the credit contribution for cooperatives and associative

organizations that work in the field, as well for community organizations. 4,550 producers located in 397 farming communities, particularly in the south of the country, were served with credits.

Agrobanco was a sponsor of the COP20 held in Lima. During the event, the agreement between ASBANC and ASOMIF, called the Green Protocol, was signed.

Among its services, it’s worthy to mention the Forest Credit. The objective of this program is to contribute to the financing of the sustainable use of forest, demonstrating the value of the existing timber potential, through loans granted to producers with concessions according to Law No. 27308 - Law of Forestry and Wild Fauna; to contribute to the protection of the Amazon forest and of the biodiversity with rational management; to encourage the increase in the employment of local labor, ensuring higher incomes44.

**Main support funds to agriculture and credit administered by the Bank**

Agrobanco mainly provides first level credit to natural and juridical people in the following agricultural sectors: agriculture, livestock, forestry, agroindustry, aquaculture and activities related to transformation and commercialization of products coming from these sectors; and second level credit to financial entities. The bank operates with own resources, third party resources and funds given in administration, such as guarantee funds.

The following is a list of the credit products offered by the bank:

- Crédito Agroequipo;
- Crédito Forestal;
- Crédito Agrícola;
- Crédito Ganadero;
- Crédito Credifinka;
- Crédito Creditierra;
- Crédito Profundización Financiera;
- Crédito Diversificación de Cultivos;

The main representative types of credit in the portfolio are: crédito agrícola (58.1% at april 2015), crédito pecuario (livestock, 5.3% at april 2015) and Profundización Financiera (3.9% at april 2015).

**Green Bank Plan**

Agrobanco has drawn an institutional line to adapt to global flow, aware of the need to promote mechanisms that support the national efforts to adopt measures for climate change adaptation and mitigation. In this scenario, it launched the Green Bank Project aimed at managing social and environmental risks in internal and financial management policies.

The department Banco Verde constitutes the working group with knowledge on CSA and agro-ecological practices. As part of the Green Bank Plan, capacity and dissemination of activities towards a greener and climate smart agriculture have been planned during 2016. These will put the basis for the promotion of financial support to sustainable agriculture.

The green portfolio of AGROBANCO, with a total of 22,944 projects, represents 9.61% of the total loan portfolio with own resources which target the following products:

- Shade grown cocoa: projects concerning the development of agroforestry systems which combine the cocoa cultivation with forestry species (timber and non-timber).
- Shade grown coffee: projects concerning the development of agroforestry systems which combine the cultivation of coffee with forestry species (timber and non-timber).
- Irrigation systems: Projects which promote the efficient use of water.
- Good agricultural practices: projects which promote resilient production systems, adapted to climate change, with technologies which increase the productivity and reduce the negative impact on the environment (organic production is an example).

**Lessons learned from pilot implementation process**

Agrobancos is managing a wide series of individual loans of different types, covering either costs of installation of new crops, of perennial plantations, or annual input costs of annual crops. Such credits are allocated on the basis of cost per ha multiplied by the number of ha of the investor. They are usually targeted to a specific range of area with a minimum area close to 2-5 ha and a maximum area around 20-23 ha, in order to reach small to medium farmers.

For a specific type of loan, there are area objectives in number of ha to be covered for different regions which allow Agrobancos to allocate appropriate amounts to fit with foreseen demand. It is based on request expressed by cooperatives and investors at the level of decentralized Agrobancos offices. For instance, the limited sample of investment project loans extracted from the 2015 campaign and appraised included 3425 farmers and around 10000 ha of crops. It appears that every type of loan is concerning a range from 100 to 4000 ha which could be distributed in 1-3 provinces and in a wider range of districts.
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adopting MRV Methodology

<table>
<thead>
<tr>
<th>Crop/ product</th>
<th>Objective</th>
<th>beneficiaries</th>
<th>Type of loan</th>
<th>Geographic Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palm oil</td>
<td>4000 ha</td>
<td>800</td>
<td>10-12 months</td>
<td>2 prov - 4 districts</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>50 ponds</td>
<td>50</td>
<td>9-12 months</td>
<td>1 prov</td>
</tr>
<tr>
<td>coffee-oriented agroforestry</td>
<td>200 ha</td>
<td>100</td>
<td>48-60 months</td>
<td>1 prov, 3 districts</td>
</tr>
<tr>
<td>Quinoa organic</td>
<td>1500 ha</td>
<td>300</td>
<td>8-10 months</td>
<td>10 prov</td>
</tr>
<tr>
<td>Banana organic</td>
<td>1100 ha</td>
<td>550</td>
<td>24-36 months</td>
<td>2 prov, all districts</td>
</tr>
<tr>
<td>Ginger</td>
<td>200 ha</td>
<td>200</td>
<td>10-14 months</td>
<td>5 prov</td>
</tr>
<tr>
<td>Cacao organic</td>
<td>1000 ha</td>
<td>500</td>
<td>5-13 months</td>
<td>2 prov, 4 districts</td>
</tr>
<tr>
<td>Coffee organic</td>
<td>1000 ha</td>
<td>500</td>
<td>5-13 months</td>
<td>2 prov - 3 districts</td>
</tr>
<tr>
<td>Mango organic</td>
<td>100 ha</td>
<td>50</td>
<td>7-15 months</td>
<td>2 prov- 4 districts</td>
</tr>
<tr>
<td>Cacao convent</td>
<td>1500 ha</td>
<td>375</td>
<td>6-13 months</td>
<td>3 prov, 4 districts</td>
</tr>
<tr>
<td>Total</td>
<td>10600 ha</td>
<td>3425</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A majority of projects appraised are based on short loans supporting existing activities and covering annual production costs which are estimated in advanced detail in credit files (detailed inputs, labour and service costs...). Only three types of investment reviewed were targeting really installation investments with over 1 year medium term loans: Coffee oriented agroforestry (48-60 months), banana organic (24-36 months) and to some extent ginger (10-14 months). However a range of annual loans supports organic or green farming crops. Credit selection criteria for some credit do favour groups or cooperatives. Participation to association and to cooperative is considered among conditions facilitating approval. Many credits are provided with accompanying technical assistance (planned TA).

a) **Which level and which type of appraisal will be selected**

With a team of Agrobanco experts, a sample of some of the projects described above has been appraised to assess how far the EX-ACT MRV tool is adapted to such project profiles and to test different levels of appraisal. It came out that it could be both effective to appraise by individual private projects or just by group of projects.

Appraisal by individual project could provide a specific Carbon performance to private investors and to use it for requesting carbon-based payment of environment services. Such approach could be also valid at level of groups – cooperatives of farmers. On the other side, appraising projects as slots of common loans would allow Agro Banco to derive a global Carbon Footprint of Agro Banco loan portfolio much quicker.

This key question has a wide effect on the design and operationalization of such MRV in Agrobanco. Ex-ante appraisal by wide group of loans could be managed by a small team mostly in Head-Quarters but MRV appraisal at level of individual loans, cooperatives –associations would require a decentralized capacity. Furthermore any attempt to link EX-ACT MRV with incentives or payment of services would require decentralized management.

The focal team will have to discuss about the type of appraisal it is more suitable to carry out, according to the characteristics of the credit line. They should decide whether an individual appraisal of single small projects, or an aggregated appraisal of categories of projects will be more
appropriate. Since several similar projects are situated in different regions, an appraisal of categories of projects at regional level can also be a valid strategy.

b) Results per ha and per beneficiary

The table below does provide income per ha and GHG emission per ha (negative = mitigation). The value of GHG mitigation is estimated to assess the value of Carbon co-benefit generated which could drive to possibilities of Payment of Environment Services or farmer incentives. Such results of additional income and GHG are also provided per farmer or per beneficiary. Income derived performances do allow an appraisal with pro-poor impact of green credit policies.

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Income per ha US$</th>
<th>carbon footprint/ha/yr</th>
<th>Value GHG mitigation /ha US$/yr</th>
<th>Income per beneficiary US$</th>
<th>Carbon footprint / HH/yr Tco2/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Palm plantation</td>
<td>463</td>
<td>-7.2</td>
<td>216</td>
<td>2315</td>
<td>-36.0</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>0</td>
<td>1359</td>
<td>0.8</td>
<td></td>
<td>0.8</td>
</tr>
<tr>
<td>coffee-agroforestry</td>
<td>2586</td>
<td>-5.2</td>
<td>156</td>
<td>5171</td>
<td>-10.4</td>
</tr>
<tr>
<td>Quinua</td>
<td>861</td>
<td>-0.7</td>
<td>20.4</td>
<td>4305</td>
<td>-3.4</td>
</tr>
<tr>
<td>Banana organic</td>
<td>6316</td>
<td>1.38</td>
<td>0</td>
<td>12632</td>
<td>2.7</td>
</tr>
<tr>
<td>Ginger</td>
<td>10197</td>
<td>-2.2</td>
<td>65.1</td>
<td>25493</td>
<td>-5.4</td>
</tr>
<tr>
<td>Cacao organic (Pl&lt; 20 yrs)</td>
<td>691</td>
<td>-9.6</td>
<td>288.9</td>
<td>1272</td>
<td>-17.7</td>
</tr>
<tr>
<td>Coffee organic (Pl&lt;20 yrs)</td>
<td>916</td>
<td>-10.5</td>
<td>315</td>
<td>1832</td>
<td>-21</td>
</tr>
<tr>
<td>Mango organic (old)</td>
<td>1086</td>
<td>0.67</td>
<td>0</td>
<td>2172</td>
<td>1.34</td>
</tr>
<tr>
<td>Cacao convent (old)</td>
<td>398</td>
<td>0.67</td>
<td>0</td>
<td>797</td>
<td>1.34</td>
</tr>
</tbody>
</table>

Such comparative analysis of results by type of project does drive to other MRV management issues. The short term loans funding mostly inputs are often replicated every year and GHG impact appraisal on 20 years is less relevant than for medium term investment funding installation of new crops, and planting of new perennial or forest areas which generate higher occurrence of land use change. This analysis leads to the following questions:

- Should we select only the highly mitigating investments for appraisal or should we cover all investment projects?
- Should we limit 20 years appraisal to medium and long term investment projects while applying a one year emission appraisal for input based credits?

c) Options of Portfolio Aggregated results

A tentative illustration of portfolio results is provided below for this sample of portfolio selected by Agrobanco, which covers only 3425 investors working on 10600 ha. Aggregated Mitigation impact is around 89000 tco2 / year and additional income is estimated at US$ 8,1 million.
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

### Global GHG Mitigation of target portfolio / year TCO2

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Global GHG Mitigation of target portfolio / year TCO2</th>
<th>Additional income at portfolio level US$/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Palm plantation</td>
<td>-28 800</td>
<td>1 852 000</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>40</td>
<td>67 969</td>
</tr>
<tr>
<td>coffee-oriented agroforestry</td>
<td>-1 040</td>
<td>517 200</td>
</tr>
<tr>
<td>Quinua</td>
<td>-1 020</td>
<td>1 291 500</td>
</tr>
<tr>
<td>Banana organic</td>
<td>1 518</td>
<td>6 947 600</td>
</tr>
<tr>
<td>Ginger</td>
<td>-434</td>
<td>2 039 400</td>
</tr>
<tr>
<td>Cacao organic (Pl&lt; 20 yrs)</td>
<td>-9 630</td>
<td>690 625</td>
</tr>
<tr>
<td>Coffee organic (Pl&lt; 20 yrs)</td>
<td>-10 500</td>
<td>916 000</td>
</tr>
<tr>
<td>Mango organic (old)</td>
<td>67</td>
<td>108 600</td>
</tr>
<tr>
<td>Cacao convent (old)</td>
<td>1 005</td>
<td>597 656</td>
</tr>
<tr>
<td>Total</td>
<td>-48 794</td>
<td>1 5028550</td>
</tr>
</tbody>
</table>

Some questions are still open on the other performance indicators which will effectively being aggregated at portfolio level.

d) **Further analysis foreseen**

Such type of appraisal appropriately completed could also help Agro-Banco to rethink green policy priority credit areas and to progressively switch to more medium and long term credits with wider impact on landscape rehabilitation and sustainable farming system. Currently it could also drive to additional investigations to identify incentive systems privileging forest and agroforestry management integration and multi-cropping. Such work could feed management discussions on new green initiatives.

### 6.2 Case study: FIRA – Mexico

FIRA is part of the Mexican financial system of the Development Bank. It operates as a second-tier entity and it channels resources to the field through financial intermediaries. It focuses on small farmers through support in credit and collateral, training, technical assistance and technology transfer.

It is the biggest and first governmental agricultural financing institution of the rural sector in Mexico, followed by another important rural development bank: Financiera Rural. 60% of agricultural credits in the country come from FIRA. Its three basic lines are:

- To operate as a second tier bank;
- Promote the participation of the private sector;
- Support not only the promotion of financial services and products, but also the development of better credit technological elements.

FIRA has an extensive network of 143 agencies throughout Mexico, 40% of which are located in cities with fewer than 50,000 inhabitants. It employs more than 1130 agricultural and financial professionals with strong knowledge of farming conditions and the producers' capacities in Mexico.

Its activities meet the strategic plan, which has five pillars, set up to achieve the goal of the bank to stimulate the agricultural sector in Mexico:
- Focus on smaller producers without access to credit.
- Strengthening of structuring projects by providing training and technical assistance for projects of small producers.
- Expansion of funding flows through the participation of private financial intermediaries in the rural sector.
- Promotion of financial independence of private financial intermediaries so as to enable them to provide finance with their own funds to producers who have credit history.
- Preservation of institutional assets.

In 2013, financing flows were distributed as follows:

- Agriculture: 66.4%
- Livestock: 20.3%
- Forestry: 1.2%
- Fisheries and aquaculture: 3.3%
- Other rural activities: 8.8%

FIRA financial intermediaries, which grant credit directly to beneficiaries or through other intermediaries to producers, are divided into 22 commercial banks and 54 non-banking institutions. Nevertheless, commercial banks canalize more resources from FIRA to grant credits (up to 2/3) than the IFNB, even though small producers can be reached only through non-banking institutions.

FIRA is integrating a credit line of Green Projects into its program, in line with the Mexican policy of climate change in the agricultural sector. The objective is to achieve 5% of credit dedicated to the green line. In order to multiply its efforts towards its green intervention, FIRA is supported by international organizations such as AFD and the European Union. FIRA policies contribute to achieve the objectives of the Special program for the Climate Change 2014-2018 (PECC), which is the instrument of implementation of the directives set up in the General Law of Climate Change and the National Strategy against Climate Change.

FIRA has developed strategies aimed at developing sustainable projects with the design and innovation of green financial products for rural people. It recognizes and prioritizes low-cost credit to develop and strengthen productive infrastructure, investment in sustainable agriculture projects aimed at protecting biodiversity, energy efficiency, renewable energy and water efficiency. It promotes formal access to finance of producers and companies of the Agriculture, Forestry, Fisheries and Rural sectors, through support which enables them to become organized as borrowers, through the strengthening of their businesses, its market linkage, the use of alternative energy; considering the implementation of sustainable production technologies, granting resources for development projects benefiting the environment and climate change mitigation.

**FIRA actions to boost the financing of sustainable projects with green financial products**

In 2008, FIRA and the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) established the National Guarantee Fund for Agriculture, Forestry, Fisheries and Rural Industries (FONAGA) to guarantee loans granted by financial intermediaries to low and middle income farmers.

As part of this fund, the Green FONAGA was created in 2011, in conjunction with the Ministry of Energy (SENER), for the promotion and development of sustainable projects (bio-digestion systems, motor generators, cogeneration, solar thermal and photovoltaic systems, wind energy and small hydro, bioenergy and biofuels).
In 2011, the National Forest Fund (FONAFOR) is formed in coordination with the National Forestry Commission (CONAFOR), to promote reforestation, reduce pressure on the forest logging and offer new opportunities for profitable and sustainable businesses.

In 2012, the Guarantee Fund for the Efficient Use of Water (FONAGUA) is implemented, in coordination with the National Water Commission (CONAGUA) in order to accelerate investment and financing for efficient resource use.

FIRA, in coordination with the IDB and the International Maize and Wheat Improvement Center (CIMMYT), launched the Technology Guarantee Program (TMP) in order to expand access to financial services and protect the income of agricultural producers through a scheme of Risk Management which includes the implementation of a Technology package for Conservation Agriculture.

Within the green credit line, FIRA finances the investments in the following project categories:

- Bio combustible;
- Biodigestors;
- Ecoturism;
- Renewable energy;
- Forestry;
- Sustainable practices;
- Energy efficient use;
- Water efficient use;
- Agricultural sustainable management.

The program, supported by AFD, includes the Technical Assistance, financed with resources from LAIF (1 million euro), and aimed at strengthening FIRA capacities to develop a solid portfolio of green projects.

The SARAS (System of Environmental and Social Risks Analysis) is a tool used by FIRA to evaluate the environmental and social risks of its investments. The SARAS is in the process of being adopted and it will be diffused after being calibrated according to the results produced.

**FIRA Programs for climate change**

FIRA has a range of products and services with programs that encourage the development of activities aimed at improving the environment, mainly through mitigation of greenhouse gases. Here are the programs and their objectives:

a) **Program for the Treatment of Animal Waste (AW PoA) under the Clean Development Mechanism:**

Installing biodigesters to provide a system for treatment of waste produced by livestock activity in the country (mainly pork and dairy cattle), in order to capture and take advantage of methane to produce electricity.

b) **Program for the Liquid Waste Treatment (LW PoA) under the Clean Development Mechanism:**

Installation of biodigesters in agribusiness in Mexico (tequila, dairy and agribusiness, any liquid waste generated by its production processes). Similarly, the aim is to capture and take advantage of the methane to produce electricity or heat energy.
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

FIRA offers support with funding and guarantees for the installation of biodigesters. It gives finances up to 80% of the project, it offers institutional guarantee (50%-80%) and makes use of the Green FONAGA guarantee and of FIRA special programs.

FIRA also offers a preferential access to international bond carbon markets through the BioCarbon program, which gives solutions for obtaining carbon credits, in a safer, easier and faster way, that facilitate producers to include their projects in international markets.

Lessons learned from pilot implementation process

During FIRA training, some very capital-intensive projects, within its portfolio, were appraised. It concerned a tomato greenhouse cultivation unit of 9 ha with 8-10 tomato cycles per year. The non-soil based highly intensive unit was compared to a tomato project producing the same production based on the ground (90 ha). Such comparison does show very similar results when we compare carbon footprint per Ton of tomato (0.4 to 0.5 Tco2/t). Another appraisal did cover an intensive livestock fattening unit. The livestock project is limited to installation of greenhouses, while the number of livestock heads fed per year remains similar to the without project situation (2000 heads).

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Investment 000 US$</th>
<th>Area (ha)</th>
<th>GHG balance TCO2/ year</th>
<th>Additional income US$ / year</th>
<th>Additional Jobs created</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-soil based Intensive tomato Unit</td>
<td>5090</td>
<td>9</td>
<td>1511</td>
<td>742500</td>
<td>144</td>
</tr>
<tr>
<td>Trad. Tomato horticulture project</td>
<td>5090</td>
<td>90</td>
<td>1479</td>
<td>742500</td>
<td>144</td>
</tr>
<tr>
<td>Livestock intensive fattening Greenhouse</td>
<td>424</td>
<td>1</td>
<td>-79</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rubber plantation</td>
<td>9.8</td>
<td>1</td>
<td>-8.6</td>
<td>1650</td>
<td>0.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Income per ha US$</th>
<th>carbon footprint/ha/ yr Tco2/yr</th>
<th>Carbon footprint Per ton of product Tco2/ T prod</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out-soil Intensive tomato Unit</td>
<td>82500</td>
<td>168</td>
<td>0.47</td>
</tr>
<tr>
<td>Trad. Tomato horticulture project</td>
<td>8250</td>
<td>16.5</td>
<td>0.46</td>
</tr>
<tr>
<td>Livestock intensive fattening Greenhouse</td>
<td>-</td>
<td>-79</td>
<td>-0.01</td>
</tr>
<tr>
<td>Rubber plantation</td>
<td>1650</td>
<td>-8.6</td>
<td>-6.25</td>
</tr>
</tbody>
</table>

These case studies underline the need to work also with carbon footprint performances (CO2 emissions per ton of production) which does decrease through intensive production. This type of agricultural system is also supported by the Mexican government and it is considered as a green project within the national climate change strategy.

a) Foreseen steps of MRV building

FIRA has now a trained team who will carry out the MRV assessment of projects at headquarter, but also at the decentralized agencies. FIRA Representatives and experts have recognized the validity and importance of the tool for the appraisal of projects which underlines the three aspects
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

of mitigation, resilience and economic impact, in order to strengthen its green line portfolio. In particular, the possibility offered by the tool to analyze not only the resilience and mitigation but also the economic aspect, through the income indicator, has been evaluated as an important and useful aspect for the appraisal of FIRA portfolio.

FIRA plans to also use SARAS (System of Environmental and Social Risks Analysis), which is a tool used by FIRA to evaluate the environmental and social risks of its investments. The SARAS is in the process of being adopted starting in early 2016 and internal trainings and diffusion have been developed within FIRA. This is the reason why the implementation of EX-ACT MRV Tool will start on the second half of next year, targeting in particular the regional decentralized offices which will be in charge of the project mitigation impact appraisal.

From the final discussion, it has come out that it could be both effective to appraise projects at individual, private level or at the aggregated level. The individual level appraisal can be very useful in the case of big projects to be analyzed in a detailed manner, whereas the aggregated level has been identified as advantageous by FIRA in terms of cost-effectiveness.

6.3 Case study: FINAGRO - Colombia

Colombia represents a good example of how climate finance could be integrated with domestic agricultural finance. An active process of development and implementation of new financial products, such as Payments for Performance for emissions reductions, or other climate funds, targeted at mitigation and adaptation to climate change, is on-going.

The Ministry of Environment (Minambiente) is promoting the implementation of Payments of Environmental Services (PES), for which the Government does plan a real start by 2016 using different internal and external funding sources (decree and legal clearance in preparation). The program targets a critical mass of small farmers (around 25000 farmers) as in the Costa Rica Model (700 000 ha with PES).

Colombia, through its Fund for Financing the Agricultural Sector (FINAGRO), is moving towards the promotion of more productive and sustainable systems.

FINAGRO is a second tier bank that provides financing to first tier banks such as Banco Agrario and private banks. Through this mechanism, farmers can access funding under preferential interest rates.

The rural agricultural credit is granted to be used in different stages of production of agricultural, aquaculture and fishery goods, its primary processing and / or marketing, as well as to mining, rural and ecological tourism, crafts, processing and marketing of metals and precious stones.

FINAGRO, as a second-tier bank, seeks to address the issue of lack of incentives of the financial sector in order to place credit resources in the agricultural sector, given the high risk that this productive activity entails. With these resources FINAGRO manages to grant rediscounted resources to finance productive projects in the sector, across multiple financial intermediaries.45

---

FINAGRO is creating very important opportunities for the future of rural microfinance in Colombia through the recently created Rural Microfinance Fund (FMR), which is currently in the implementation phase and whose aim is to promote the use of green micro finance.46

**Green Protocol**

In 2012, FINAGRO has signed the Green Protocol (Protocolo Verde), a cooperative agreement between the National Government and the Financial sector, which aims at creating enabling financing conditions for projects with social and environmental benefits.

The Protocol is based on three main strategies:

- **Strategy 1**: to generate guidelines and tools to promote the sustainable financing development through credit facilities and / or investment, and programs that promote the sustainable use of renewable natural resources, protection of the environment and the competitiveness of the productive sectors of the country, contributing to improving the quality of life of the population.
- **Strategy 2**: to promote the sustainable use of renewable natural resources or goods and services.
- **Strategy 3**: Consider in the analysis of credit and investment risk, the environmental and social impacts and costs that are generated in the activities and projects to be funded, based on the compliance with the Colombian environmental regulations.47

In this framework, FINAGRO commits itself in the testing and implementation of new innovative financial products designed to encourage sustainable production.

**Management of the Agricultural Guarantee Fund – FAG**

One of the main tasks of FINAGRO is the management of the FAG, which aims to increase access to funding, allowing producers to obtain credit for the development of projects that are technically, financially and environmentally viable, but do not have the necessary collateral. In this respect, the Fund is committed to the financial institution to respond with a predetermined percentage of the loan granted, if the debtor cannot honour its obligation, through his project.

**Services offered by FINAGRO in the sustainable forestry and agriculture framework**

- **a) Rural Capitalization Incentive - ICR**

It is an economic benefit that is granted for the establishment of new investments targeted to modernization, competitiveness and sustainability of agricultural production.

The Colombian Ministry of Agriculture and Rural Developments (MADR) and the Fund for Agricultural Financing (FINAGRO) approved a Rural Capitalization Incentive (RCI), which allows farmers access to loans for establishing Intensive Sylvo-pastoral systems (ISS). It includes a 40% reduction in the cost of the loan by meeting specific tree planting densities (FINAGRO, 2011). The silvopastoral RCI provides a 40% subsidy on total costs when farmers establish up to 99 hectares, and 30% if they establish more than 100 hectares of ISS associated to

---

47 Protocolo Verde, 2012, **Agenda de Cooperación entre el Gobierno Nacional y el Sector Financiero Colombiano**, ASOBANCARIA
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

timber trees. Currently, the incentive is $500 usd/Ha for ISS with over 7,000 shrubs/Ha and about $800 usd for ISS with at least 5,000 bushes and 500 timber trees/Ha (i.e. 10 fodder trees per one timber tree). Additionally, a Technical Assistance Incentive (TAI) aimed to the development of productive projects that include any farming activity is currently available. The TAI covers up to 80% of the technical support costs for a period not exceeding three years. This is another important tool for promoting ISS.  

In 2015, fourteen loans have been granted. Among these, grants have been established for projects regarding sylo-pastoral activities and improvement of land and water resources management.

b) Forestry Incentive Certificate – CIF

It is the recognition of the Colombian State, through the Ministry of Agriculture and Rural Development, in agreement with FINAGRO administration, to the positive externalities of commercial reforestation as the environmental and social benefits generated, having a positive impact to the whole population. Its purpose is to promote the realization of direct investments on new forest plantations, which are protective and productive, on lands suitable for forestry.

Natural and private legal persons, or decentralized municipal or district entities, whose purpose is the provision of public services, who commit themselves to fulfil a Plan of Forest Establishment and Management, through a contract signed with the competent entities for the management of sustainable natural resources and environment, can have access to the incentive (ART.1).

The Forestry Incentive Certificate is the document issued by the competent authority for the management and administration of renewable natural resources and environment, which entitles the beneficiary to obtain directly and only once, the fixed amount of money, by the bank that has been authorized for this purpose by FINAGRO.

The Forestry Incentive Certificate will have a value up to:

- a) Seventy-five percent (75%) of total net costs of establishing plantations with native species, or fifty percent (50%) of establishing corresponding to plantations with introduced species as long as it deals with plantations with a density of over 1,000 trees per hectare. When the density is less than this figure and not less than fifty trees per hectare, the value is proportional to each tree.
- b) Fifty percent (50%) of total net maintenance costs that incurred from the second year until the fifth year after the planting is carried out, whatever the type of species.
- c) Seventy-five percent (75%) of the total costs incurred during the first five years for the maintenance of natural forest areas that are within a plan of Forest Establishment and Management.

The Ministry of Agriculture will determine which tree species are considered native or introduced, and it will indicate, on the 31st October of each year, the national average value of total net costs of establishing and maintaining the tree species and it will set the incentive for each tree (it may


take into account regional differences and the advice from businesses and unions of the national forest sector).\textsuperscript{50}

The Ministry of Agriculture and Rural Development sets, by resolution, the values of the incentive for five years, annually, which cover up to 50% of the cost of one year of establishment and four years of maintenance of the plantation. The monitoring of the activities of maintenance of the plantations, which benefit from the CIF, will be carried out each year by the MADR or by the delegated entity\textsuperscript{51}.

c) \textit{Agro Security Income - AIS}

The "Agro Security Income - AIS" program includes various instruments among which are the incentives for productivity, through which processes such as land improvement, irrigation and drainage infrastructure, determining factors of farmers’ competitiveness, are strengthened, to the extent that they allow efficient use of water resources, they mitigate the adverse climatic effects, reduce the seasonality of production and, in general, improve productivity.

Between 2011 and 2013, the MADR selected FINAGRO to support him in the administration of the resources provided by the DRE program and to accompany the implementation of these resources, which ends in September 2015\textsuperscript{52}.

\textit{Lessons learned from field visit}

FINAGRO has shown great interest in the methodology proposed by FAO, underlining its MRV needs within PES implementing Mechanism. In particular its biggest interest is to develop an appropriate mechanism to monitor and implement Payment of Environment Services, since green development is a key priority for the government of Colombia. The Government priority focused on designing PES scaling up mechanisms has been confirmed by all parties (MINAMBIENTE, DNP).

FINAGRO does implement a series of incentive policies delivering subsidies to farmers and enterprises whose delivery is reduced. For scaling up (green protocol), they envisage to redesign the system as Payment of Environmental Services using GHG and climate resilience MRV to assess performance of PES.

Due to availability of FINAGRO experts and calendar issues, the EX-ACT team did not manage to organize a follow up mission in Colombia as initially planned. Therefore, due to the difficulty to retrieve the necessary data for project appraisal, no application of the methodology on FINAGRO projects has been possible. Nevertheless, the interest showed by the institution to the tool envisages a stronger collaboration in the near future.

\textsuperscript{50} Ley 139 de 1994 (julio 21), diario oficial No. 41.401, Creación CIF, Por la cual se crea el certificado de incentivo forestal y se dictan otras disposiciones, Senado de la República de Colombia | Información legislativa

(disponible en: www.secretariasenado.gov.co)

\textsuperscript{51} Ministerio de Agricultura, 2013. Manual Operativo del CIF, MinAgricultura República de Colombia.

\textsuperscript{52} FINAGRO, \textit{Recursos Hídricos}, (sitio web: https://www.finagro.com.co/productos-y-servicios/recursos-h%C3%ADdricos)
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

a) **Focus areas selected**

In this line, FINAGRO did clearly select three areas in which the tool could be used on a pilot basis:
(i) ICR (Rural Capitalization Incentive) which concerns water resources and sylvopastoral projects, 
(ii) CIF (Incentive for Forest Certificate) and (iii) ISA (Insurance of Agricultural Incentive).

**Forest Incentive Certificate (CIF):** CIF is a commercial reforestation incentive recognized by the National Government. It promotes species with technology package proved on the country, like pine, eucalyptus, teak and acacia, among others. The average plantation cost are around seven to 12 million COP per hectare. The average subsidy is around 2 million COP per hectare and can be considered as a Payment for Environmental Services. It is paid 50% in the first year and the remaining in the following four years.

The CIF supports around 600 projects per year with an average area of 70 hectares, being able to pay over 74 thousand millions COP between 2012 and September of 2015. CIF has over 40 thousand hectares with an existing contract and every project is submitted with GPS tracking.

**Rural Capitalization Incentive (ICR):** This incentive seeks to provide government cash grant to clients who implement new investment projects for capitalizing and modernizing agricultural, livestock and fishery production. Even though the main objective of this instrument is to promote competitiveness, modernization and sustainability of agricultural production, there are special investments that are related with sustainable development, like the ones of silvo-pasture and land improvement and water resources management. Between March and August of 2015, almost 1350 projects were presented with these goals. The high limit of the credit is 1.6 million US$.

**Insurance of agricultural incentive (ISA):** This is an incentive to protect the food production by a subsidy, which helps producers to pay insurance premiums. It is implemented through insurance companies. In 2015, 15,740 insurance policies have been covered.

Among these three application areas, the CIF and ICR are the ones where the EX-ACT MRV tool can be easily and directly applied. Regarding ISA there is the possibility to link it with PES in an indirect way by encouraging farmers to develop risk reduction and mitigation and resilience systems and practices.

Since FINAGRO mostly operates as an intermediary, there is the need to link with first level banks, like Banco Agrario which represents 89% of operations of FINAGRO. Banco Agrario, together with FINAGRO are developing green lines in microfinance.
7. GUIDANCE TOWARDS MRV METHODOLOGY BUILDING FOR NATIONAL DEVELOPMENT BANKS

7.1 NDBs in line with countries’ green planning perspectives

The investment in efforts to reduce vulnerability to change, stresses and shocks at various scales has been significant in recent years. In relation to climate change, this high level of investment is likely to continue in the future given both the change already 'locked' into the climate system and the limited success to date in stabilizing greenhouse gas emissions. As a result, stakeholders responsible for efforts to reduce vulnerability are increasingly interested in understanding the impact of these investments.

The widest and most enduring impacts for farmers are likely to occur where agricultural development institutions mainstream mitigation into finance and technical support programs. In the public sector, for example, the transition to new mitigation practices could be supported through new forms of credit, risk sharing or insurance mechanisms, agricultural development funds, sectoral policies, and local government agricultural infrastructure and technical facilitation.

We can assist to a growing tendency, in many Latin American countries, towards the development and implementation of green policies, which aims at addressing the issue of climate change. In this framework, financial institutions and national banks in these countries are very active in supporting green projects in the AFOLU sector, within their investment credit line. It drove to incorporate environmental targets within the policies that determine their actions.

The adaptation and mitigation of climate change has acquired a central position in government priorities and gradually considered as an essential aspect of any investment decision. As such, it is necessary to estimate the impact of any public investment project in terms of co-benefit or externality on the adaptability and mitigation of climate change. The rapid rise of climate funds and their rational use in the financing of public and private development investments demand a rigorous monitoring and evaluation of impacts both to ensure that the expected benefits of these actions are realized and to better guide investments.

However, many of these financial institutions lack a structured and functioning MRV (Monitoring, Reporting, and Verification) system in order to track progress of these investments and measure the sustainability of green projects in the AFOLU sector and their impact on climate. Therefore the design of an appropriate mechanism for MRV of NDB is a main issue.

For this reason it is necessary to define indicators of climate change (adaptation and mitigation) and a methodology suitable for portfolios of bank financing or project financing funds. Such a system would be very useful to cover portfolios of small projects, in order to contribute to the greening process of the global financial system.

MRV is often useful to encourage the bank to create new "green" financial products. These green products, however, must also find a market and an economic and financial profitability. Public incentives are important in creating this market but it must grow with reductions in costs and risks in the long term.
7.2 Towards a step-by-step design process

This work is based on an iterative process characterized by the following actions (i) developing a methodological proposal based on the capitalization of experiences, (ii) presenting and discussing it with the heads of national banks, (iii) testing with partners (iv) discuss the results, and (v) adjusting it according to the characteristics and needs of the institutions.

This approach has helped to identify a set of actions and decisions to take at the level of National Development Banks, in order to build their own monitoring system of impact of investment projects on climate adaptation and mitigation. This is still an ongoing process open to modifications and improvements following a constructive discussion with the direct actors of the NDBs involved in the study, in order to build a suitable and efficient MRV system which can be effective and adapted to each national context.

Such process has been implemented with the active participation of the financial institutions and it is still flexible and subject to further development. The next step of the process should be self-managed by the National Development Banks, within their decision-making process. Nevertheless, NDBs may require additional support in terms of capacity buildings and trainings from their partner (AFD).

Therefore, the answer to the following points should help to develop the MRV system suitable for a specific NDB:

i. Selection of impact indicators
ii. To what extent should the NDB implement an ex-ante analysis?
iii. Should the NDB target the MRV system on some specific projects?
iv. How to manage the MRV system in terms of data management?
v. At what institutional level should the MRV be positioned?
vi. What period of analysis is to be taken into account for the carbon impact (greenhouse gas emissions)?

Alternative are proposed in the following table illustrating the differentiation and adaptation options for such MRV at the level of National Development Bank.

<table>
<thead>
<tr>
<th>Iterative Process</th>
<th>Specific Questions</th>
<th>Answers Y/N</th>
</tr>
</thead>
</table>
| Selection of impact indicators                         | • Association of indicators on Mitigation and Adaptation to climate change with other environmental (energy, water) and socioeconomic (income, jobs) indicators  
• Which indicators to be selected  
• Use of a multi-criteria analysis on the resilience assessment  
• Economic Evaluation of impact mitigation |             |
| At what level the ex-ante analysis should be carried out? | • At the level of individual project investment  
• At the level of group of project investments of the same type  
• Derive the results by type of projects (GHG per ha, level of resilience ...) to integrate them into the bank credit management system |             |
### Should the NDB target the MRV system on some specific projects?
- Application targeted on green projects (carried out as part of a Green Protocol) or projects with environmental content (forestry, agroforestry, watershed, rehabilitation)
- Systematic application on all credit projects
- Other Decisions

### How to manage the MRV system in terms of data management?
- Integration in the credits data base with automatic system of impact calculation
- Integration in the results database after the analysis with the MRV EX-ACT tool (EXCEL)

### At what institutional level should the MRV be positioned?
- Strong involvement of decentralized agents (see direct credit providers partners (Tier 1)
- Ex-ante aggregated analysis of projects at the central level to minimize the decentralized work
- Joint involvement of decentralized offices and headquarters by optimizing the methodologies of collection and performance analysis

### What period of analysis is to be taken into account for the carbon impact (greenhouse gas emissions)?
- Annual performances (GHG TCO2 / year) for seasonal credit on production costs
- Performance over 20 years on medium and long term credit covering perennial crops, agro-forestry plantations or change of land use.
- Both according to the credits

### 7.3 Foreseen perspectives open by a performing MRV system

During the construction process of the MRV system it should be defined how the system will be used in terms of operations and development results. The management team will identify procedures on the following points:

i. Project Portfolio Analysis;
ii. Development of performance;
iii. Reporting modalities of GHG reduction performance;
iv. Use of MRV to target, negotiate and implement payments of environmental services;
v. Use of MRV to grant the NDB the access to international funds (see the Climate Funds)

For the moment, this second part of the process was mentioned during the meetings with FIRA, AGROBANCO and FINAGRO, without being really discussed in depth. At the level of representatives of National Development Banks, the discussion is still ongoing and progresses gradually as the system will begin to produce results.
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

Table: Use of MRV in portfolio analysis, incentive policies and the mobilization of funds

<table>
<thead>
<tr>
<th>Iterative Process</th>
<th>Specific Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis of projects portfolio</td>
<td>- Modalities of aggregation of annual results and of cumulative results year by year</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Valuation of carbon co-benefits generated</td>
<td></td>
</tr>
<tr>
<td>Performances enhancement</td>
<td>- Communication Policy of NDB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Promotion of the environmental impact of certain projects</td>
<td></td>
</tr>
<tr>
<td>« Reporting » modalities of GHG reduction performance</td>
<td>- Integration into the GHG national monitoring,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Liaison with the implementation of NAMA or INDC (Intended Nationally Determined Contributions)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Element of negotiation in the use of the National Climate Fund (FNC or NCF)</td>
<td></td>
</tr>
<tr>
<td>Use of MRV to target, negotiate and implement payments</td>
<td>- Definition of access threshold to subsidised rates</td>
<td></td>
</tr>
<tr>
<td>of environmental services</td>
<td>- From what volume of total CO2 emission reduction per ha a project is considered &quot;green&quot;</td>
<td></td>
</tr>
<tr>
<td>Use of MRV to grant NDB the access to climate international funds</td>
<td>- Conditions of loans AFD, FFEM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Conditions of climate funds (GCF, GEF)</td>
<td></td>
</tr>
</tbody>
</table>

With the increasing and diversified access to climate funds, MRV of climate finance will remain an important element in assessing the deployment and general use of climate finance and in strengthening the efficiency and effectiveness, as it will help to gain a better overall understanding of the scale, distribution and use of both public and private support. It will help to show who profits from financial support and make it possible to identify gaps in regional and sectoral support, for example. It will also help to monitor and evaluate trends and progress in climate-related investment. Finally, MRV of climate finance will account for how scarce public resources are being used and also strengthen public awareness of how taxpayers’ money is used.

7.4 Peer Review Recommendations and Conclusions

On 14th December 2015 a peer review was organized at FAO Headquarters in order to present the methodology for MRV of green investment projects for Latin America financial institutions, developed by FAO and the results of the testing method on the projects sample of the credit line of the three institutions in Latin America: FINAGRO in Colombia, AGROBANCO in Peru and FIRA in Mexico. This allowed to stimulate an open discussion among the experts and partners invited and to derive useful advice and inputs for the study.

The advantage of having an MRV system suitable for NDBs’ portfolio of projects and in line with the national context has been widely recognized and appreciated. In particular, the tool shows the advantageous relationship cost/benefits in its implementation within the institutional system and the easiness of use. Some of its strong points that have also emerged during the peer review are i) the capacity to appraise not only the mitigation and adaptation impact, but also important economic and social aspects of the projects and the general households’ resilience; ii) the possibility to have

53 GIZ, 2014, Measuring, Reporting and Verifying Climate Finance, GIZ Germany
not only an ex-ante, but also a mid-term and ex-post analysis of the impact of a project or group of projects.

Furthermore, it has been stressed the importance of having a well-structured MRV system, which allows to improve the accountability of a development financial institution in order to have access to public incentives.

Second-tier banks will surely have more difficulties on the implementation of the MRV system than the first tier banks, because they need traceability of their financial clients. For this purpose they need more support and institutional capacity building and they will have to work on a closer relationship with their final partners.

During the peer review, the two partners FIRA and AGROBANCO have expressed their remarks on the methodology applicability and the foreseen use of the MRV Tool.

Both partners have confirmed their need of evaluating the impact of the whole credit portfolio. FIRA, in particular, has underlined the importance of the tool in supporting NDBs in screening their portfolio's projects in order to help them to define what a “green” project really is, and it also stated that this is a process that requires time to change the mentality and the way to operate of the 1st tier banks in Mexico. For this purpose, FIRA will need to convince them of the advantage of applying the system, which is simple to implement and easy to access.

FIRA has also expressed the possibility to integrate the use of the MRV Tool within the System of Environmental and Social Risks Management (SARAS), which will be soon implemented within FIRA in order to allow early identification, assessment and management of environmental and social risks generated by FIRA customers in the development of activities and projects to be financed. This will results in a more centralized and cost-effective process.

On the other side, being a 1st tier bank with a good, structured green credit line program, AGROBANCO is in a more advanced position, regarding the use of the MRV tool. It has the ambitious goal of reaching 25% of green credit line in 4 years and thanks to the MRV system, it wants to contribute, to the INDCs (Intended Nationally Determined Contributions) of Peru and to strengthen relationships with the ministries of Environment and Agriculture (MINAMBIENTE and MINAGRI). Both the NDBs also highlighted the need and advantage to have a good and structured MRV system in order to apply to green incentives and other useful subsidies.

AFD expressed its willingness to continue the collaboration with the EX-ACT Team in the future. Since the demand of an MRV system for green climate finance will be very high all over the world in the near future, AFD aims at extending the use of the methodology to the whole Latin America region and in other continents. This is supported by the interest of the European Union towards AFD approach and FAO methodology.

Furthermore, AFD is a key driver of IDFC which could be a good platform of implementation of the system. For the moment IDFC only has a methodology for energy and infrastructure but not for agriculture. Therefore, the role of EX-ACT as an ex-ante, but also mid-term and post-evaluation monitoring tool, gives the opportunity to NDBs to look for other funds and to have NDB public policy tool to invest in green transition.

The peer review has also underlined the importance to work on a global and concrete definition of “green credit”, which is not always clear, in order to enable a real transformation of the mentality towards a concrete and effective low carbon strategy.
Bibliography


De Olloqui F., 2013, *Bancos públicos de desarrollo : ¿hacia un nuevo paradigma?*, BID


European Commission, 2015, Latin America Investment Facility (Available at: https://ec.europa.eu/europeaid/sites/devco/files/factsheet-laif_en.pdf)


GEF, 2014. *Updated Results-Based Management Framework for Adaptation to Climate Change under the Least Developed Countries Fund and the Special Climate Change Fund*, GEF/LDCF.SCCF.17/05.


Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology


IIED, 2011, Tracking Adaptation and Measuring Development, Climate Change Working Paper N. 1


Ley 139 de 1994 (junio 21), diario oficial No. 41.401, Creación CIF, Por la cual se crea el certificado de incentivo forestal y se dictan otras disposiciones, Senado de la República de Colombia | Información legislativa (disponible en: www.secretariasenado.gov.co)


Speranza, C. I., 2010, Resilient Adaptation to Climate Change in African Agriculture, DIE, Bonn, Germany

Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

Speranza C.I., Bockel L., 2015, *Climate Resilience Assessment of Agriculture and Forestry Projects and Programmes (CRAAF)*, Centre for Development and Environment, University of Bern, FAO.


Websites:


FINAGRO, Recursos Hídricos, (sitio web: https://www.finagro.com.co/productos-y-servicios/recursos-h%C3%ADdricos)

FIRA, Fideicomisos Instituidos en Relación con la Agricultura, (sitio web: https://www.fira.gob.mx/Nd/index.jsp)

ANNEXES: DETAILED REVIEW OF INITIATIVES

Annex 1: MRV in preparation in Green Climate fund

GCF is moving in the direction of the development of detailed international indicators to measure and monitor funding outcomes, impacts and the desired paradigm shift. It has been noted consistently by LDCs and SIDS however, that the more complexities there are, the more difficulties this creates for their access to the fund. The GCF takes an interesting approach in this context, as other funds have not undertaken the development of similar frameworks until after some experience had been achieved. For example, the GEF undertook the process of developing such a framework sometimes after its establishment. Concern was expressed that by setting up a complex framework of this nature, the GCF was setting up a separate MRV mechanism outside of the UNFCCC negotiations process in circumstances where it is a financial mechanism of the UNFCCC and which is accountable to the COP.

The Board has agreed on a logic model intended to create a management framework to meet the ‘paradigm shift’ objectives. The GCF paradigm shift objective for mitigation is to ‘shift to low emission sustainable development pathways’ and in the context of adaptation to ‘increase climate-resilient sustainable development’. This logic model to be applied across both adaptation and mitigation includes agreed inputs, activities, outputs, outcomes and impacts.

The mitigation and adaptation paradigm-shift results will be measured using a combination of quantitative and qualitative information that goes beyond simply aggregating the results’ indicators.

Where applicable, mitigation projects/programmes that also generate adaptation results should report on adaptation indicators (and vice versa for adaptation projects/programmes with mitigation results). For example, a project that primarily intends to improve land and forest areas contributing to emission reductions (result 9.0 in the mitigation PMF) and, by doing so, also contribute to increasing the resilience of the ecosystem (result 4.0 in the adaptation PMF) would report on the relevant indicators for both mitigation and adaptation. This key principle should be driving present MRV proposal.

GCF is widely multi-sector oriented and it does limit focus on agriculture indicators. Among GCF performance indicators linking with agriculture and forestry, in Mitigation performance measurement framework, the only one is (i) Tonnes of carbon dioxide equivalent (t CO2eq) reduced or avoided (including increased removals) as a result of Fund-funded projects/programmes – forest and land-use sub-indicator.

However, in GCF Adaptation performance measurement framework, indicators considered which have relevance for AFOLU sector are:

- Total Number of direct and indirect beneficiaries; Number of beneficiaries relative to total population
- Number of males and females benefiting from the adoption of diversified, climate resilient livelihood options (including fisheries, agriculture, tourism, etc.)
- Number of food secure households (in areas/periods at risk of climate change impacts)
- Number of technologies and innovative solutions transferred to promote climate resilience (link with Climate smart agriculture)
- Number and value of physical assets made more resilient to climate variability and change
- Coverage/scale of ecosystems protected and strengthened in response to climate variability and change most probably expressed in areas (Ha)
- Value (US$) of ecosystem services generated or protected in response to climate change

GCF demonstrates a clear target towards quantitative indicators which could be summed and aggregated by country and allow easy comparison between projects and groups of projects.
Annex 2: ASAP Program - IFAD

The Adaptation in Smallholder Agriculture Programme (ASAP), launched by IFAD in 2012, channels climate finance to smallholder farmers so they can access the information tools and technologies that help build their resilience to climate change. ASAP has become the largest global financing source dedicated to supporting the adaptation of poor smallholder farmers to climate change. The program is working in more than 30 developing countries, using climate finance to make rural development programs more climate-resilient. The programme is financed by IFAD and the governments of Belgium, Canada, Finland, Netherlands, Norway, Sweden, Switzerland and United Kingdom.

Developing countries members are able to access a new source of co-financing targeted specifically at scaling up and integrating climate change adaptation in smallholder development programs. ASAP has been established in a flexible manner that will allow new donors to contribute at any point. ASAP funds co-finance projects using clear selection criteria and applying a results framework, which contains 10 specific and measurable indicators of achievement.

Based on a thorough monitoring and evaluation system, this is expected to demonstrate the value of investing climate finance in smallholders to the Green Climate Fund and other climate initiatives. To maximize incentives, ASAP co-financing is not considered an automatic entitlement but used on a case-by-case basis. The key qualitative criteria for project selection are the additional value of the ASAP funding to the project that is co-financed (for example, whether the grant will provide added value to a project and is not simply displacing other forms of public or private finance/activities); and whether the ASAP-supported project has strong support from the beneficiary Government, the relevant IFAD country team and communities of smallholders.

ASAP has developed an innovative results framework which aims to measure and demonstrate the multiple-benefits of investing in good smallholder adaptation. Quantitative *ex ante* estimates of potential project contributions towards the ten key indicators of ASAP Results Framework are provided. The ten indicators are set out below:

1) The number of poor smallholder household members whose climate resilience has been increased because of ASAP, disaggregated by sex.
2) The size of the overall resulting investment.
3) The project leverage ratio of ASAP versus non-ASAP financing.
4) The tonnes of GHG emissions (CO2e) avoided and/or sequestered.
5) The increase in number of non-invasive on-farm plant species per smallholder farm supported.
6) The increase in hectares of land managed under climate-resilient practices. This indicator includes any type of initiatives aimed at promoting sustainable management of natural resources and more specifically those sustainable land-management practices applied to address previously identified environmental or climate-related hazards, such as erosion, salinization, soil degradation, flooding, drought, infestations. In particular, it measures the hectares of land under: - integrated natural resource management practices; - crop diversity management; - improved soil management and erosion control practices; - sustainable livestock practices; - agroforestry practices; - improved water management practices; - land managed under diversified agricultural systems; - land covered by weather insurance schemes.
7) The percentage change in water use efficiency by men and women.
8) The number of community groups including women’s groups involved in ENRM and/or DRR formed or strengthened.
9) The value of new or existing rural infrastructure made climate-resilient.
10) The number of international and country dialogues, related to climate change challenges, to which the project would make an active contribution.

Some of these indicators are more relevant than the others for monitoring the climate change outcomes and outputs of a project. Furthermore, some of them have a higher relevance in terms of facility of aggregation and data collection.

The table below provides an analysis of each indicator regarding the level of aptitude of aggregation and collection of data:

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Relevance for Climate Change MRV</th>
<th>Facility to aggregate</th>
<th>Facility to collect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of poor smallholder household members whose climate resilience has been increased because of ASAP</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Size of the overall resulting investment</td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project leverage ratio of ASAP versus non-ASAP financing</td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonnes of GHG emissions (CO2e) avoided and/or sequestered</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Increase in number of non-invasive on-farm plant species per smallholder farm supported</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Increase in hectares of land managed under climate-resilient practices</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Change in water use efficiency</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Number of community groups including women’s groups involved in ENRM and/or DRR formed or strengthened</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Value of new or existing rural infrastructures made climate-resilient</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Number of international and country dialogues related to climate change challenges to which the project would make an active contribution</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

The 10 ASAP Outcome indicators will enable aggregation of data generated from ASAP projects and draw on existing and improved institution-wide results and portfolio monitoring systems. Each
ASAP-supported project will include activities that make contributions to ASAP’s 10 key indicators – this information will be collected as part of the project monitoring process and aggregated to form the global results framework. Projects will include a range of project-specific success indicators that will inevitably go beyond the ASAP top 10 indicators. In addition, IFAD will harvest information from a wide range of project-specific sub-indicators in order to learn lessons in key areas, such as gender impacts.

ASAP will emphasize the importance of understanding the underlying causes of vulnerability and of incorporating climate risk information into vulnerability assessments – not just as a one-off exercise during project design but as an overall iterative approach to project management and monitoring and evaluation. Special focus will be given on linkages between agriculture, nutrition, DRR and social protection for adaptation and resilience building.
Annex 3: Farmers performances monitoring in Madagascar (FAO 2014)

The case of Madagascar, part of the research done by FAO and the Institut de Recherche pour le Développement (IRD) on testing a methodology to simultaneously appraise the multiple benefits of CSA and agroecology success stories in terms of incremental income, mitigation and climate resilience at plot level, is analysed as a case of MRV system. The capitalisation of success stories functions as an important tool to facilitate the replication and scale-up of best practices. The appraisal methodology is based on a series of household interviews with farmers and field operators to appraise the effective cost-benefit of improved practices. For pilot testing of the methodology on multi-benefit appraisal of CSA and agroecology success stories, Madagascar and Senegal have been selected in which projects and public policies are supporting smallholder farmers to adapt their conventional farming system towards more productive and climate friendly approaches.

The appraisal methodology is based on a series of micro level interviews with farmers to appraise the effective cost-benefit of CSA / agroecology at plot level. Comparing the performance of both, CSA / agroecology practices and conventional practices before project implementation, enables to quantify the impact of CSA / agroecology. Surveys are designed to provide multiple-benefit performance indicators analysing simultaneously (1) the pro-poor impact (farm income), (2) climate resilience impacts (assets and income shocks) and (3) mitigation impacts. The capitalisation of success stories thereby functions as an important tool to facilitate the replication and scale-up of best practices. It furthermore allows to get a realistic perspective of achievable performance of improved techniques applied by farmers and to identify associated implementation conditions.

Data collection is realised using a short and concise quadrilateral questionnaire, consisting of plot specific agronomic and socio-economic data supplemented by environmental and institutional context information. The questionnaire is applicable for cropping practices as well as for livestock production. Three main aspects are captured, farm income, climate mitigation and climate resilience. Farm income (pro-poor impact) is calculated taking plot inputs and outputs into account. Climate resilience is expressed as farmers’ perception indicating positive, similar or negative impact generated by CSA / agroecology. Seven different resilience indicators, drought, flood, storm, pest, crop failure, soil erosion and high temperature are appraised. And climate mitigation is determined using EX-ACT.

Main factors considered

<table>
<thead>
<tr>
<th>Variables</th>
<th>Income</th>
<th>Climate Resilience</th>
<th>Climate Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity of plot inputs and outputs</td>
<td>Drought</td>
<td>General description (climate and soil)</td>
<td></td>
</tr>
<tr>
<td>Price of produce and inputs</td>
<td>Flood</td>
<td>Amount of trees and species included into the farming system</td>
<td></td>
</tr>
<tr>
<td>Percentage of own-consumption</td>
<td>Storm</td>
<td>Land management practices</td>
<td></td>
</tr>
<tr>
<td>Labour requirement for family labour or</td>
<td>Pest</td>
<td>Land use changes</td>
<td></td>
</tr>
<tr>
<td>wage earner</td>
<td>Crop failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soil erosion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High temperature</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The questionnaire is primarily designed for plot level appraisal, supplemented by a part evaluating land use changes at farm level. Firstly, improved farming practices at plot level are identified. Secondly, agricultural productivity of CSA / agroecology “improved practice” and the before project situation “conventional practice” is captured, appraising input and output quantities at plot level. Thirdly, farmers’ perception on increased climate resilience is assessed. And fourthly, land use changes at farm level are evaluated.
Resilience is presented as aggregated resilience including the seven indicators, drought, flood, storm, pest, crop failure, soil erosion and high temperature, by adding up positive resilience or subtracting negative resilience, resulting in a possible range from -100% reduced resilience generated to 100% additional resilience generated by CSA / agroecology.

The following table presents the indicators according to the three different resilience categories:

<table>
<thead>
<tr>
<th>INCREMENTAL CLIMATE RESILIENCE GENERATED ( 0-4  0 = none, 1= reduced, 2 = significant , 3= high, 4 = very high)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Watershed - landscape</strong></td>
</tr>
<tr>
<td>Increased drought resilience</td>
</tr>
<tr>
<td>Flood resilience</td>
</tr>
<tr>
<td>Storm resilience</td>
</tr>
<tr>
<td>Reduced soil erosion</td>
</tr>
<tr>
<td>Reduced risk of landslide</td>
</tr>
<tr>
<td>Water saved</td>
</tr>
</tbody>
</table>

The tested methodology to appraise multi-benefit performance in CSA / agroecology seems to be a promising approach to evaluate the impact of agricultural development projects. Applying the methodology can help evaluating the performance of single project participants regarding income, climate resilience and mitigation.
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

Annex 4: IIED- Evaluation based on the integration of climate risk into development

The International Institute for Environment and Development proposes an approach to the evaluation of adaptation ‘success’ that combines assessment of how well climate risks to development are managed by institutions (‘upstream’ indicators), with assessment of how successful adaptation interventions are in reducing vulnerability and keeping development ‘on track’ in the face of changing climate risks (‘downstream’ indicators). The aim is to provide a framework that defines indicators’ categories or ‘domains’ that can be tailored to specific contexts, rather than a ‘toolkit’ for monitoring and evaluation that prescribes particular indicators. This approach combines capacity-related indicators with indicators of vulnerability and the assessment of development outcomes under climate change. The approach also addresses issues of moral hazard and information asymmetry. By looking at how climate risk is managed by authorities and linking this with the vulnerability and development outcomes experienced by the climate vulnerable poor, the framework shows whether and how the adaptation needs of marginalised groups are addressed, and what safeguards are in place to prevent maladaptation.

The framework’s purpose is to ensure that adaptation investments lead to climate resilient development, and the goal is that development trajectories are maintained despite climate change effects.

A number of ‘high-level’ indicators are proposed for evaluating adaptation, many of which will need to be operationalised by translation into context-specific indicators relevant to particular situations. ‘Upstream’ indicators represent progress on the integration of climate risk management into development processes, actions and institutions. ‘Downstream’ indicators represent the impacts of adaptation interventions of development ‘on the ground’ in terms of impacts on development outcomes and vulnerability.

More work needs to be done to link upstream and downstream indicators. While downstream indicators are likely to present more challenges than upstream indicators in an operational context, downstream indicators take us further towards measuring the ultimate impact of adaptation, and have greater communications value than upstream indicators.

4.1 Climate risk management indicators (“upstream indicators”)

The following indicators are proposed to evaluate the extent to which climate risk management is integrated into development processes, actions and institutions:

- The use of climate information (and M&E information) in policy & programme design (e.g. policies and programmes informed by evidence of emerging climate trends and scenarios of future climate change).
- How well the components of the national system conduct National Adaptive Capacity functions (with reference to, for example, the World Resources Institute National Adaptive Capacity framework).
- Proportion of development initiatives that are modified compared to a ‘business-as-usual’ case in order to make them more climate-resilient.

54 IIED, 2011, Tracking Adaptation and Measuring Development, Climate Change Working Paper N. 1,
- Mechanisms for targeting the climate vulnerable (e.g. for carrying out climate risk assessment and vulnerability assessment and using the results of such assessments to inform development policy and practice).

- Institutional framework of regulatory and legal support plus macroeconomic management for climate resilience (e.g. requirements for certain types of development initiative subject to screening for climate change-related risks).

4.2 Climate relevant development/ vulnerability indicators (“downstream indicators”)

Assessment of reductions in the vulnerability of human populations to climate change related hazards and risks as a result of adaptation interventions will be at the heart of adaptation evaluation, as discussed above. However, this may be complemented by a number of other measures of the impact of adaptation. The following indicators are proposed:

- Numbers of beneficiaries of CC interventions (i.e. number of people benefiting from projects or project components that address climate change issues, e.g. through integration of measures to promote resilience or reduce climate change-related risks).

- Coverage of CC interventions (proportion of portfolio that includes measures to address climate change).

- Numbers of people experiencing reductions in vulnerability, represented by movement from more vulnerable to less vulnerable category/score in key indicators (based on variety of context specific indicators converted into scores that can be aggregated across contexts).

- Value of assets and economic activities protected or made less vulnerable as a result of adaptation interventions (e.g. based on capital assets with reduced physical exposure compared with business-as-usual scenario, turnover of businesses incorporating adaptation measures resulting from projects, etc).

- Benefit/ cost ratios of adaptation options identified/implemented (based on ratio of value of assets and productivity made less vulnerable to adaptation expenditure).

These indicators proposed above are not intended to substitute for indicators and processes at the country level, which are tailored to local contexts. Nor are they intended to be comprehensive. They are designed such that they can 'sweep' existing frameworks and approaches in order to present an aggregated picture of overall progress towards adaptation goals.
Annex 5: The Pilot Program for Climate Resilience (PPCR)

The PPCR is part of the Climate Investment Funds (CIFs), which aim to assist developing countries to integrate climate change concerns into national development planning. The PPCR provides scaled-up programmatic finance (loans and grants) to support countries’ efforts to integrate climate resilience into development planning and implementation. The purpose of the monitoring and reporting system is to track progress towards climate-resilient development at the national level and to monitor, report and learn from the implementation of PPCR activities at country and project/programme levels.

Giving priority to highly vulnerable least developed countries, including small island developing states, the PPCR provides grants and highly concessional financing (near-zero interest credits with a grant element of 75%) for investments supporting a wide range of activities, such as:

- Improving agricultural practices and food security
- Building climate-resilient water supply and sanitation infrastructure
- Monitoring and analyzing weather data
- Conducting feasibility studies for climate-resilient housing in coastal areas

The results framework contains 11 indicators. Five of these indicators are core indicators, measured and tracked across all the PPCR pilot countries at the level of the investment plan (programmatic level). These core indicators allow country results to be aggregated and synthesized. The remaining 6 optional indicators, as well as country and project specific other indicators may be used depending on the countries’ specific needs and requirements.

The five core indicators are:

1. Degree of integration of climate change into national including sector planning (data collection: at national level, scorecard method, baseline data needed)
2. Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience (data collection: at national level, scorecard method, baseline data needed)
3. Quality and extent to which climate responsive instruments/ investment models are developed and tested (data collection: at project/program level, scorecard method)
4. Extent to which vulnerable households, communities, businesses and public sector services use improved PPCR supported tools, instruments, strategies, activities to respond to climate variability and climate change (data collection: at project/program level, data table)
5. Number of people supported by the PPCR to cope with the effects of climate change (data collection: at project/program level, data table).

The six optional indicators are:

1. Change in percentage of households whose livelihoods have improved
2. Change in losses/damages from CC/CR in PPCR areas
3. Percentage of people with year round access to water
4. Change in budget allocation to support CC/CV
5. Evidence showing that climate information, products/services are used in decision making climate sensitive sectors

55 IIED, 2011, Tracking Adaptation and Measuring Development, Climate Change Working Paper N. 1,
6. Leverage of PPCR funding against public and private investments in climate sensitive sectors.

The core indicators are measured in a participatory way by means of a combination of qualitative and quantitative methods using scorecards and data tables in Microsoft Excel. Each scorecard lists 4 to 5 key questions that assess progress in implementing PPCR activities using a score from 0 (no) to 10 (yes/completely). The scoring is informed by evidence, which is collected and presented at a key stakeholder meeting with the PPCR country focal point and representatives from government, private sector and civil society. The purpose of the meeting is to find agreement on the scores and provide justifications with narrative descriptions. The presentation of the data reports to a wider stakeholder group helps to ensure quality, transparency and accountability.

The system only indirectly measures resilience building as this would require more in-depth assessments over time. These core indicators are typically a sort of complex indicators which requires qualitative appraisal which are not suitable for the object of the present study on simple indicators suitable for the global context of national development banks.
Annex 6: The Adaptation Fund

The Adaptation Fund (AF) is a financial instrument under the control of the Parties to the United Nations Framework Convention on Climate Change and its Kyoto Protocol (KP).

The AF finances adaptation projects and programs in developing countries that are Parties to the KP.

The AF indicators share a number of similarities with those of the PPCR framework, addressing issues such as the extent of integration of adaptation and resilience-building measures into national development strategies, policies introduced or adjusted to address climate change risks, and so on. There is a greater explicit emphasis on the impacts of adaptation on populations and the systems on which they depend (e.g., ecosystems, health systems, infrastructure), assessed through quantitative indicators referring to factors such as numbers of projects, numbers of institutions targeted/affected by interventions, numbers of adaptation actions taken, and number of assets strengthened.

Vulnerability/resilience of populations is addressed by three of the AF indicators: percentage of households with more secure access to livelihood assets, percentage of population with sustained climate-resilient livelihoods, and number of households with more secure access to livelihood assets. The first and last of these measure have the same outcome in different ways, and all are concerned with the livelihood aspects of vulnerability. The additional guidance on these indicators suggests that they are defined in more detail at the project level, and that changes in access are measured on a 1-5 scale, echoing the scoring approach suggested for vulnerability indicators in this report.

As in the case of the PPCR framework, the role of vulnerability assessments is recognized (in indicator 1.1). The AF also assesses exposure (e.g., number of people affected by climate variability, defined as those suffering losses as a result of climate variability) and development/adaptation outcomes (e.g., reduced number of people suffering losses from extreme weather events). The latter type of indicator is associated with the problems of assessing outcomes over evaluation timescales that might be too short to be representative of the relevant aspects of climate variability and of climate trends, and the problems of assessing the impacts of interventions against a shifting climatic baseline, as discussed above.

The AF focus is very much on livelihoods and general resilience, and appears to be relatively short term, focusing on ‘protecting’ existing practices and systems in the face of evolving, but historically familiar, risks. The PPCR framework has a stronger focus on the mechanisms through which adaptation is integrated into development planning and practice, and is potentially more able to accommodate issues of transformational change.

The AF five core indicators allow the Fund to aggregate quantitative indicators for a portfolio that is, by nature, diverse (including agriculture to water management, coastal management, rural development, food security, and Disaster Risk Reduction, among others). To increase transparency and demonstrate value, the Board has approved five indicators.

These five indicators are:

1) Number of beneficiaries (direct and indirect);
2) Number of Early Warning Systems;
3) Assets produced, developed, improved or strengthened;
4) Increase income or avoided decrease in income;
5) Natural assets protected or rehabilitated.
Table: Adaptation Fund standard indicators.

<table>
<thead>
<tr>
<th>Core Indicator: No. of beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator 1: Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis</td>
</tr>
<tr>
<td>Indicator 1.1: No. of projects/programmes that conduct and update risk and vulnerability assessments</td>
</tr>
<tr>
<td>Core Indicator 1.2: No. of Early Warning Systems</td>
</tr>
<tr>
<td>Indicator 2: Capacity of staff to respond to, and mitigate impacts of, climate-related events from targeted institutions increased</td>
</tr>
<tr>
<td>Indicator 2.1.1: No. of staff trained to respond to, and mitigate impacts of, climate-related events</td>
</tr>
<tr>
<td>Indicator 2.1.2: No. of targeted institutions with increased capacity to minimize exposure to climate variability risks</td>
</tr>
<tr>
<td>Indicator 3.2: Increase in application of appropriate adaptation responses</td>
</tr>
<tr>
<td>Indicator 3.1: Percentage of targeted population awareness of predicted adverse impacts of climate change, and of appropriate responses</td>
</tr>
<tr>
<td>Indicator 4.1: Increased responsiveness of development sector services to evolving needs from changing and variable climate</td>
</tr>
<tr>
<td>Core Indicator 4.2: Assets produced, developed, improved or strengthened</td>
</tr>
<tr>
<td>Indicator 4.1.1: No. and type of development sector services to respond to new conditions resulting from climate variability and change</td>
</tr>
<tr>
<td>Indicator 5: Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress</td>
</tr>
<tr>
<td>Core Indicator 5.1: Natural assets protected or rehabilitated</td>
</tr>
<tr>
<td>Indicator 6.1: Increase in households and communities having more secure access to livelihood assets</td>
</tr>
<tr>
<td>Indicator 6.2: Increase in targeted population’s sustained climate-resilient alternative livelihoods</td>
</tr>
<tr>
<td>Core Indicator 6.1.2: Increased income, or avoided decrease in income</td>
</tr>
<tr>
<td>Indicator 7: Climate change priorities are integrated into national development strategy</td>
</tr>
<tr>
<td>Indicator 7.1: No. of policies introduced or adjusted to address climate change risks</td>
</tr>
<tr>
<td>Indicator 7.2: No. of targeted development strategies with incorporated climate change priorities enforced</td>
</tr>
</tbody>
</table>
Annex 7: GEF-CBP Landscape Carbon Monitoring, Reporting and Verification System

The Landscape Carbon Monitoring, Reporting, and Verification (MRV) System is an online information system and set of tools to help GEF project managers implement the measurement and monitoring of carbon benefits in their projects. The online system provides multiple resources to describe projects, map project geographic information, compute carbon stocks, estimate greenhouse gas emissions associated with project activities, and generate reports. The “Create a Project” tool set includes resources for describing projects, storing and sharing project documentation, mapping the locations of project activities, conducting field inventories, and calculating carbon stocks in the project area. The “Work on your Project” tool set is an online greenhouse gas emissions calculator that estimates emissions and removals from land cover changes and other project activities. The “Report on your Project” tool set includes report generators to report on project information, geographic information, carbon stocks, and greenhouse gas emissions. The Landscape Carbon MRV System is applicable in all land uses including forestland, cropland, grassland, wetland, settlements, and other land uses.

The Landscape Carbon MRV System is an integrated suite of tools that provides a framework for measuring carbon benefits for the project-level monitoring and evaluation of GEF funded development projects. The information system could also be used for monitoring, reporting and verification of regulatory or voluntary carbon market focused projects funded by GEF or other project developers. The system is applicable for sustainable land management projects that include landscape biomass carbon in both forest and non-forest land cover. The system allows for multiple levels of data availability and data input requirements. Project measurement data are uploaded into an online relational geodatabase for storage, analysis, query and output. Users may produce reports of ex ante or ex post carbon stocks and greenhouse gas emissions within their project areas. The online Landscape Carbon MRV System provides mapping features that relate inventory data and carbon stocks to the project area and multiple strata within the project boundaries.

The Carbon Benefits Project recommends that users follow the principles, guidelines and methodologies recommended by the United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC).

Indicators for CBP Landscape Carbon MRV System

The Landscape Carbon MRV System provides several results and indicators related to forest land cover and carbon stocks in project area (see Table 1 below). The primary outputs of the information system are carbon density, carbon stocks, and greenhouse gas emissions in the project area.

Table 1: Potential Results and Indicators for the CBP Landscape Carbon MRV System.

<table>
<thead>
<tr>
<th>Result</th>
<th>Core Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHG removals from enhanced carbon stocks</td>
<td>tCO2e removed</td>
</tr>
<tr>
<td>GHG emissions from reduced carbon stocks</td>
<td>tCO2e emissions</td>
</tr>
<tr>
<td>Reduced GHG emissions from avoided deforestation</td>
<td>tCO2e avoided emissions</td>
</tr>
<tr>
<td>Reduced GHG emissions from avoided degradation</td>
<td>tCO2e avoided emissions</td>
</tr>
</tbody>
</table>
Annex 8: GEF-AMAT (Adaptation Monitoring and Assessment Tool)

In April 2011, the Secretariat launched the Adaptation Monitoring and Assessment Tool (AMAT), to monitor LDCF/SCCF (Least Developed Countries Fund/Special Climate Change Fund) adaptation activities. AMAT is the first GEF tracking tool for climate change adaptation projects, which has since been completed for more than 70 projects financed under the LDCF and the SCCF and which can be used for monitoring during three periods of time: ex-ante, mid-term, ex-post.

The tool provides 14 useful generic indicators for adaptation projects (regardless of sector), provides a framework for addressing the overall success of the project in light of LDCF/SCCF goals, and strikes a balance between comprehensiveness and ease of use.

The tracking tool is designed to facilitate the collection, aggregation and communication of progress and outcomes across a large number of projects and programs. The tool is therefore focused on quantitative data and it is restricted to ensure the consistent use of each indicator and unit of measurement. As a result, the tracking tool necessarily represents a limited picture of the expected and actual results of a given project. It is not intended to replace the more specific and more comprehensive monitoring and evaluation frameworks designed for each project.

Moreover, because the tool is submitted only at CEO endorsement/approval, midterm, and project completion, it does not capture outcomes that emerge after project completion.

The following are the indicators of the Tracking Tool for Climate Change Adaptation Projects and Programs under the LDCF and the SCCF:

1) Number of direct beneficiaries.
2) Type and extent of assets strengthened and/or better managed to withstand the effects of climate change.
3) Population benefitting from the adoption of diversified, climate-resilient livelihood options.
4) Extent of adoption of climate-resilient technologies/practices.
5) Public awareness, activities carried out and population reached.
6) Risk and vulnerability assessments, and other relevant scientific and technical assessments carried out and updated.
7) Number of people/geographical area with access to improved climate information services.
8) Number of people/geographical area with access to improved climate-related early warning information.
9) Number of people trained to identify, prioritize, implement, monitor and evaluate adaptation strategies and measures.
10) Capacities of regional, national and sub-national institutions to identify, prioritize, implement, monitor and evaluate adaptation strategies and measures.


GEF, 2014. Updated Results-Based Management Framework for Adaptation to Climate Change under the Least Developed Countries Fund and the Special Climate Change Fund, GEF/LDCF.SCCF.17/05.
11) Institutional arrangements to lead, coordinate and support the integration of climate change adaptation into relevant policies, plans and associated processes.

12) Regional, national and sector-wide policies, plans and processes developed and strengthened to identify, prioritize and integrate adaptation strategies and measures.

13) Sub-national plan and processes developed and strengthened to identify, prioritize and integrate adaptation strategies and measures.

14) Countries with systems and frameworks for the continuous monitoring, reporting and review of adaptation.
Annex 9: Environmental screening for UNDP projects

Mainstreaming environment into UNDP program and projects is a dynamic, continuous process and is an integral part of the management cycles. A good environmental assessment and management system not only strengthens environmental performance but also promotes improved and sustainable development outcomes.

In this regard, UNDP requires that all projects undergo an environmental screening; with the exception of “Fast Track” projects in which case the “Strategy for Fast-Tracking UNDP’s Crisis Response” will be followed while ensuring compliance with the overarching environmental sustainability policy. The screening process aims to determine whether or not a project should be subject to further EA prior to project approval (according to the importance or severity of potential environmental impacts) or whether additional inquiry is needed to make this decision.

UNDP approach is using a series of environment indicators including also climate change indicators. This work is referred mostly for reviewing which climate indicators are used. They refer to following questions:

2.1 Will the proposed project result in significant greenhouse gas emissions? Indicative types of activities that MAY result in significant GHG emissions include: Electricity generation/consumption (>10MW of black/brown coal generation using average technology, > 20MW of Combined Cycle Gas Turbines installed for both these assumed ~ 90% availability); Animal Waste Management (concentrated/ housed pig farm with >50,000 animals & anaerobic conditions, concentrated/ housed poultry farm with >200,000 broilers & anaerobic conditions); landfills (in temperate or tropical climates, residential waste in an anaerobic landfill (covered and compacted, or at least deep, and without spontaneous fires) from a city of 1M population or more).

2.2 Are climate change-related events, such as floods, drought, landslides, windstorms, sea level rise or forest fires, likely to affect the desired project outcomes? For example, a water irrigation project for communities located on steep slopes vulnerable to landslides.

2.3 Will the achievement of any of the project outputs be influenced by climate-related impacts? For example, a project that has the objective to improve the socioeconomic conditions of a population may be affected by floods in the project location, which will impact water quality and increase the risk of infectious diseases of the populations that would benefit from the project, therefore contributing to a decrease in the health conditions.

2.4 Is the proposed project likely to directly or indirectly increase environmental and social vulnerability to climate change now or in the future (also known as maladaptive practices)? For example, a project that would involve indirectly removing mangroves from coastal zones or encouraging land use plans that would suggest building houses on floodplains would enhance the surrounding population’s vulnerability to climate change, specifically flooding.
Annex 10: FAO TCI Guidance

In FAO TCI Guidance document “Incorporating climate change considerations into agricultural investment programmes” (Dubois K M, 2012), FAO does propose climate change-related indicators to be incorporated in the project/programme’s results framework or the M&E framework).

It underlines how identifying and selecting project/programme indicators may be complex for a number of reasons, including the following: (1) challenges in distinguishing adaptation interventions from development activities (only necessary if the project/ programme targets adaptation funding); (2) uncertainty of climate change impacts; (3) difficulty in monitoring and evaluating long-term impacts; (4) complexity of climate change issues; and (5) gaps in MRV of climate mitigation interventions in agriculture, especially in smallholder farming systems.

Table 6.1 of Annex 6 presents a list of climate change-related indicators in agricultural investment projects or programmes. However it represents a wide set of over 60 detailed indicators too specific for additionality and generating practical application issues on data availability.

Table 6.2 summarizes some indicators collected from project/programme documents in a number of organizations. Some were used to complete the multicriteria resilience indicator developed.

On M&E plan, the report recommends (i) “to incorporate climate change considerations in the project/programme’s M&E plan, based on the project/ programme’s M&E framework (which may also be referred to as the results framework or results management framework, depending on the IFI)”, (ii) to ensure that the targets and indicators for monitoring the climate change outcomes and outputs are clearly defined in the project/programme monitoring plan, (iii) to identify the necessary tools and arrangements needed to monitor realistic climate change-related indicators included in the project/programme’s results framework.

Regular private and public sector funds in support of agricultural development provide most of the funding to support agriculture evolution towards climate smart options. These need to be oriented towards adopting a climate lens. Public funding must create a conducive enabling environment and reduce barriers to transitioning to more sustainable agricultural systems, leveraging much larger flows of private investment to embrace adaptation and mitigation opportunities. Because LDCs are often considered high risk areas for investors, the UNFCCC has a role to play in finding new ways to attract private investment for adaptation and mitigation projects/programmes.

Because Financial institutions and development banks are important vehicles to channel global sources of funds to those most vulnerable to devastating climate change impacts, climate finance also faces issues of governance and appropriate monitoring allowing to appraise both resilience and mitigation impacts as co-benefits to poverty reduction and income generation.
Annex 11: FAO ESA working document: Resilience check – Assessing the contributions of agriculture and forestry development projects to climate resilience

This FAO consultancy work proposes an assessment framework that can be used to analyse the contribution of projects to climate resilience of agriculture-based livelihoods and agricultural landscapes. It is based on "the farmer livelihood resilience framework" (cf. Ifejika Speranza 2010, Ifejika Speranza et al., 2014). It is expected that the information so collected will "give insights into the relative importance of buffering capacity, self-organization and capacity for learning in generating resilient livelihoods amongst smallholder agricultural producers". Insights gained can be used "to provide better guidance on what actually increases resilience in smallholder agricultural livelihoods across a range of varying agro-ecological and socio-economic conditions, as well as the policy levers that can most effectively promote them."

Three approaches can be used in a resilience check: 1) ex ante analysis, which assesses the potential of project activities or farmer practices to build or improve resilience; 2) a monitoring during the project to assess the extent the project activities are progressing in improving climate resilience, and; 3) an ex-post analysis, which assesses the contributions to climate resilience and determines the drivers and conditions responsible for practices that build resilience. The proposed resilience assessment framework can be used as a complementary tool to the Ex-ACT-Tool (Ex-Ante Carbon-balance Tool) used for appraising the impact of agriculture and forestry development projects, programmes and policies on the carbon balance (FAO).

To operationalize the livelihood resilience framework for a multi criteria qualitative ex-ante appraisal of projects and national agricultural plans in tools that can give a rough indication of key resilience gaps and priority areas for further investigation, the resilience framework has been decomposed into questions. The unit of data collection is the proposed intervention whose potential contributions to resilience are to be assessed.

In an ex ante assessment the project team can estimate the potential of a project/programme to build resilience, through contributing to the various dimensions of resilience. Resilience does not derive from one indicator. As such the relative strengths of the resilience dimensions depends on the social-ecological (including political) framing conditions. While buffer capacity largely captures farmers’ endowments and access to various capitals, self-organisation and learning include more process-like and practice-like indicators, capturing the agency of the farmers in building resilience.

Therefore three levels of analysis have been identified: watershed/landscape, household and crop-livestock enterprise level. The major question is to what extent the intervention has built or improved climate resilience at the following dimensions:

1. Buffer capacity of the watershed/landscape
2. Buffer capacity of the household
3. Buffer capacity of crop-livestock production
4. Self-organisation of households
5. Learning capacity of the households

Every level is to be appraised through a series of qualitative questions to be answered with a scalable range from 0 (none) to 4 (high). Indicators should be weighted in line with the specificity of country.
<table>
<thead>
<tr>
<th>Buffer capacity of watershed and landscape and project area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To what extent does the project improve land cover? (e.g. agroforestry, cover crops etc.)</td>
</tr>
<tr>
<td>2. To what extent does the project reduce soil erosion?</td>
</tr>
<tr>
<td>3. To what extent does the project improve soil conditions (e.g. soil moisture, soil structure etc.)?</td>
</tr>
<tr>
<td>4. To what extent does the project improve efficient use of water?</td>
</tr>
<tr>
<td>5. To what extent does the project save water?</td>
</tr>
<tr>
<td>6. To what extent the project area is protected from climate shocks</td>
</tr>
<tr>
<td>7. To what extent the project infrastructure - building investments are climate-proof</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Buffer capacity of crop –livestock production</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. To what extent does the project reduce crop failure?</td>
</tr>
<tr>
<td>9. To what extent does the project improve resistance of crops to pests and diseases?</td>
</tr>
<tr>
<td>10. To what extent does the project improve resistance of livestock to pests and diseases? (e.g. through vaccination)</td>
</tr>
<tr>
<td>11. To what extent does the project reduce post-harvest losses?</td>
</tr>
<tr>
<td>12. To what extent does the project increase practice of mixed cropping/intercropping?</td>
</tr>
<tr>
<td>13. To what extent does the project promote on-farm diversity (annuals/perennials, mixed cropping, mixed farm enterprise e.g. livestock-crop)?</td>
</tr>
<tr>
<td>14. To what extent does the project reduce (crop/livestock) yield variability?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Buffer capacity of households in relation to food security</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. To what extent does the project improve household food availability (e.g. through increased household food production or improved household access to food)?</td>
</tr>
<tr>
<td>16. To what extent does the project improve household food storage</td>
</tr>
<tr>
<td>17. To what extent does the project improve household income?</td>
</tr>
<tr>
<td>18. To what extent does the project increase agricultural production physical assets?</td>
</tr>
<tr>
<td>19. To what extent does the project improve access of households to agricultural inputs?</td>
</tr>
<tr>
<td>20. To what extent does the project support (existing or new) farmer groups and networks?</td>
</tr>
<tr>
<td>21. To what extent does the project increase agricultural skills?</td>
</tr>
<tr>
<td>22. To what extent does the project improve access of households to climate-related social safety nets (e.g. climate-index agriculture insurance, cash, vouchers, warehouse receipt systems etc.)?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Self-organisation of households</th>
</tr>
</thead>
<tbody>
<tr>
<td>23. To what extent does the project improve cooperation and networks of farmers (e.g. farmer groups, farmer field schools, farmer organisations etc.)?</td>
</tr>
<tr>
<td>24. To what extent does the project collaborate with national/sub-national farmer/pastoralist organisations (capacity of farmers/pastoralists to influence decisions)?</td>
</tr>
<tr>
<td>25. To what extent does the project support farmer-networks across scales (e.g. local farmer groups being connected to national farmer organisations; bridging/linking social capital)?</td>
</tr>
<tr>
<td>26. To what extent are farmers actively participating in the project?</td>
</tr>
</tbody>
</table>
Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: adapting MRV Methodology

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>To what extent does the project foster good governance (keeping of records; accounting for exclusion, elite capture and corruption) in farmer cooperation and networks?</td>
</tr>
<tr>
<td>28</td>
<td>To what extent does the project improve farmer skills to manage groups?</td>
</tr>
<tr>
<td>29</td>
<td>To what extent does the project link agriculture value chains?</td>
</tr>
<tr>
<td>30</td>
<td><strong>On-farm reliance:</strong> To what extent does the project build on local knowledge?</td>
</tr>
<tr>
<td>31</td>
<td>Learning capacity of households</td>
</tr>
<tr>
<td>32</td>
<td>To what extent does the project improve farmer knowledge of threats and opportunities to agricultural production (e.g. climate specific awareness programmes)?</td>
</tr>
<tr>
<td>33</td>
<td>To what extent does the project improve access to extension services?</td>
</tr>
<tr>
<td>34</td>
<td>To what extent does the project improve farmer/pastoralist experimentation (e.g. through farmer/pastoralists field schools, climate field schools, exchange visits)?</td>
</tr>
<tr>
<td>35</td>
<td>To what extent does the project improve access to climate information (e.g. seasonal forecasts adapted for agriculture, workshops)?</td>
</tr>
<tr>
<td>36</td>
<td>To what extent does the project improve access to market information?</td>
</tr>
<tr>
<td></td>
<td>To what extent does the project improve access to communication networks (e.g. mobile networking, radio programmes)?</td>
</tr>
</tbody>
</table>
Annex 12: Peer review recommendations and conclusions

Main Peer review conclusions

Concluding remarks and foreseen use of MRV tool

FIRA
- The EX-ACT MRV Tool can support National Development Banks in screening their portfolio’s projects in order to help them to define what a “green” project really is.
- Confirmed Need for FIRA of evaluating the impact of the whole credit portfolio.
- FIRA claims the importance of thinking also about subsidies and incentives which is the future trends.
- It’s a process that requires time to change the mentality and the way to operate of the 1st tier banks; so FIRA needs to show them that the system is simple to implement and easy to access in order to convince them of the advantage of applying it.

AGRO BANCO
- Agrobanco wants to contribute, with the tool, to the INDCs (Intended Nationally Determined Contributions) of Peru.
- Agrobanco wants to strengthen relationships with the ministries of Environment and Agriculture (MINAMBIENTE and MINAGRI)
- No commercial bank is financing reforestation in Peru, so Agrobanco wants to be involved in it starting from next year, because they want to increase the wood production, but at the same time it can represent an important mitigation opportunity.
- Agrobanco wants to reach 25% of green credit line in 4 years.

Recommendations for MRV application

NDB Technical Recommendations

FIRA
- To add criteria to check receivability with own bank regulations (for example regulations that forbid financing on deforestation).
- Simplifying the info required from partners and intermediaries and see how to integrate-link the MRV tool and the SARAS system, since there would be only one person dealing with this and the process will be centralized.
- FIRA projects usually have big amounts of data and information on agricultural aspects and it usually operates with 10 different crops. This could be useful to develop some default values and to derive values from 1st tier partners.

AGRO BANCO
- The tool can be used by NDBs to discuss and design policies with the national government (in terms of subsidies,…).
- If Agrobanco moves on with forestry, it can have access to REDD.
- The MRV tool should be used in particular for a sector (forestry sector) and mainly on the mitigation dimension rather than the adaptation (therefore starting from the forestry sector and then enlarge it also to the adaptation dimension).
### Technical Support needed by National Development Banks

<table>
<thead>
<tr>
<th>NDB</th>
<th>Technical support needs expressed</th>
</tr>
</thead>
</table>
| **FIRA**  | - To help them standardizing data collection and improve the way to properly collect data  
- To support capacity building (training) of intermediaries on the use of the MRV Tool and to integrate and process this methodology into their systems  
- Need of a manual addressing financing institutions, explaining in detail the definition of the different sustainable practices, because everyone needs to have the same understanding and criteria on the use of the tool.  
- Provision of trainings to decentralized offices.                                                                 |
| **AGRO BANCO** | - Need of applying for green incentives and this is possible only with a good and structured MRV system.  
- It is essential to familiarize with the tool through trainings and technical support provided by external partners. |