



# **SCOPE OF WORK**

## **Colombia**

**Submitted to:**

**Global Climate Change Office  
Economic Growth, Education, and Environment Bureau  
USAID**

**USAID/Colombia Mission**

**May 29, 2015**

## Contents

1. BACKGROUND.....	6
2. INSTITUTIONAL FRAMEWORK .....	7
3. LOW CARBON RESILIENT DEVELOPMENT (LCRD) PROGRAM.....	10
4. ACTIVITIES .....	11
Activity 1. Sectorial Analysis of Monitoring, Reporting, and Verification (MRV), With Emphasis in The Housing And Territorial Development Sector .....	11
Status/Needs.....	11
Proposed Activity .....	11
Partners .....	12
Deliverables .....	12
Activity 2. Cost-Benefit Analyses for Ecosystems/Protected Area Conservation to Support Local Decision-Making for Better Land Use Planning to Reduce Climate Risks.....	13
Status/Needs.....	13
Proposed Activity .....	13
Partners .....	14
Deliverables .....	14
Proposed Activity .....	15
Partners .....	15
Deliverables .....	16
Activity 3. Review of Colombia’s Computable General Equilibrium Model for Climate Change Assessments.....	17
Status/Needs.....	17
Proposed Activity .....	18
Partners .....	18
Deliverables .....	18
Activity 4. Cost-benefit Analysis for Mitigation Actions and NAMA Financing .....	19
Status/Needs.....	19
Partners .....	22
Deliverables .....	22
Annex I Proposed Technical Assistance Timeline.....	23
Annex 2. Map of Magdalena River Watershed (source: TNC).....	23
CEADIR Colombia – Scope of Work	2



Annex 3. Location of the Riohacha Municipality ..... 26

Annex 4. Status of NAMAs (Source: MADS)..... 27

Annex 5. Contact Information..... 28

## ACRONYMS

<b>CBA</b>	Cost Benefit Analysis
<b>CEADIR</b>	Climate Economic Analysis for Development, Investment, and Resilience
<b>DNP</b>	Departamento Nacional de Planeación (National Planning Department)
<b>ECDBC</b>	Estrategia Colombiana de Desarrollo Bajo en Carbono (Colombian Low Carbon Development Strategy)
<b>GCC</b>	Global Climate Change Office
<b>GCF</b>	Green Climate Fund
<b>GHG</b>	Greenhouse Gases
<b>GOC</b>	Government of Colombia
<b>IDEAM</b>	Instituto de Hidrología, Meteorología y Estudios Ambientales (Institute of Hydrology, Meteorology, and Environmental Studies)
<b>INDC</b>	Intended Nationally Determined Contributions
<b>LEDS</b>	Low-emission development strategies
<b>LCRD</b>	Low-Carbon Resilient Development
<b>MACCs</b>	Marginal Abatement Cost Curves
<b>MADS</b>	Ministerio de Ambiente y Desarrollo Sostenible (Ministry of Environment and Sustainable Development)
<b>MRV</b>	Measurement, Reporting, and Verification
<b>MVCT</b>	Ministerio de Vivienda, Ciudad y Territorio (Ministry of Housing, Cities and Territories)
<b>NAMAs</b>	Nationally Appropriate Mitigation Actions
<b>NCCAP</b>	Climate Change Adaptation Plan the National Strategy
<b>PPPs</b>	Public-private partnerships

<b>REDD+</b>	Reduced Emissions from Deforestation and Forest Degradation Plus Conservation, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks
<b>SEI</b>	Stockholm Environmental Institute
<b>SMAPs</b>	Sectoral Mitigation Action Plans
<b>SOW</b>	Scope of Work
<b>TNC</b>	The Nature Conservancy
<b>UPME</b>	Unidad de Planeación Minero Energética del Ministerio de Energía y Minas (Mining Energy Planning Unit of the Ministry of Energy and Mining)
<b>USAID</b>	United States Agency for International Development
<b>USFS</b>	United States Forest Service
<b>USG</b>	United States Government
<b>WEAP</b>	Water Evaluation and Planning model of the Stockholm Environment Institute

## I. BACKGROUND

The USAID Climate Economic Analysis for Development, Investment, and Resilience (CEADIR) Project conducted an activity planning mission to Colombia during May 5-15, 2015. The objective of the mission was to better define technical assistance to be provided by the CEADIR Project to the USAID Colombia Mission and Colombia and to develop a scope of work (SOW) and work plan for the assistance.

The planning mission was organized in response to the need, as expressed by the USAID Colombia Mission, for technical assistance and capacity building to support the Government of Colombia's (GOC) efforts to implement its National Climate Change Policy. The mission is looking for support to help Colombia prepare and develop institutional capacity to conduct evidenced-based economic analyses of alternative climate change actions, as well as to identify potential methodologies and tools that would facilitate measuring, reporting, and verification of climate change actions and financing of Nationally Appropriate Mitigation Actions (NAMAs) under the sectoral mitigation actions plans (SMAPs).

Section 2 provides an overview of the institutional framework in Colombia and current national government programs that tackle climate change challenges. Section 3 briefly discusses the work of the USAID mission's Low Carbon Resilient Development (LCRD) Program. One of the LCRD Program's responsibilities is to help USAID/Colombia coordinate and build synergies with other USAID projects, such as CEADIR. For this reason, the potential CEADIR activities identified to date consist of opportunities to support the LCRD Program, with activities described in section 4.

## 2. INSTITUTIONAL FRAMEWORK

The Ministry of Environment and Sustainable Development (MADS) and the National Planning Department (DNP) lead climate change actions in Colombia. They provide technical guidance and are responsible for coordinating the efforts of other sectors. In addition to MADS and DNP, agencies from other sectors that are active in mainstreaming climate change within their mandates include:

- Risk Management Unit, particularly trying to link responses to natural disasters with climate change adaptation efforts;
- The Mining Energy Planning Unit (UPME), which is responsible for planning and developing policies to guide the development of the energy and mining sectors;
- National Parks Administration;
- The Institute of Hydrology, Meteorology, and Environmental Studies (IDEAM), which is responsible for the development of GHG inventories;
- Ministry of Housing, Cities, and Territories (MVCT), with interests mainly in terms of climate change linkages with housing, water supply, sanitation, and solid wastes;
- Agriculture;
- Health; and
- Ministry of Mines and Energy, mainly because of the potential climate change impacts on hydropower.

The GOC is developing a comprehensive National Climate Change Policy, with four main pillars: (1) the Colombian Low Carbon Development Strategy (ECDBC); (2) the National Climate Change Adaptation Plan (NCCAP); (3) the National Strategy for Reduced Emissions from Deforestation and Forest Degradation (REDD+); and (4) the Strategy for Financial Protection from Disasters. The ECDBC and the NCCAP are the most relevant for CEADIR and are briefly discussed below:

### ***Colombia Low Carbon Development Strategy (ECDBC)***

The ECDBC aims to: (1) identify and assess actions to avoid the growth of GHG emissions associated with the growth of productive sectors; (2) develop mitigation actions plans in such sectors; and (3) create and promote the tools for the strategy's implementation, including its monitoring and reporting framework. The ECDBC has five main components:

- I. Identify and formulate sectoral alternatives for low carbon development through the development of GHG emissions scenarios, identification of mitigation actions for key

sectors, assessments of the abatement potential and costs of identified actions to develop marginal abatement cost curves (MACCs) and conduct cost-effectiveness and cost-benefit analysis (CBA), and estimate the environmental, health, economic, and social co-benefits of mitigation measures;

2. Develop , sectoral low-carbon development plans and Sector Mitigation Action Plans (SMAPs) through sectoral and cross-sectoral working groups. These plans may consist of actions, programs, measures and policies to be prioritized based on their contribution to the sector's development objectives, potential reduction of GHG emissions, economic, social and environmental co-benefits, and implementation;
3. Design and establish the measurement and reporting system for each of the SMAPs that will cover progress achieved, investments made, reduced GHG emissions, and co-benefits generated by the implementation of the SMAP;
4. Capacity development in key public and private sector stakeholders that participate in the strategy; and
5. Creation of a platform for communication and international cooperation.

A SMAP has been finalized for each of the seven economic sectors targeted by the strategy: (i) energy; (ii) agriculture; (iii) transport; (iv) industry; (v) solid wastes and wastewater; (vi) housing and territorial development; and (vii) forestry. Each sectoral ministry leads the corresponding SMAP, with technical support from the MADS and the DNP. The SMAP provides an overview of climate change actions in each sector, but does not provide detailed information about how identified measures will be implemented. MADS and DNP are currently assessing the next steps for the implementation of the SMAPs. Potential actions include:

- Develop in detail key interventions that are part of each SMAP;
- Valuation of co-benefits for selected interventions;
- Assessment of opportunities to implement the SMAPs at the sub-national levels; and
- Financing of NAMAs supporting the SMAPs.

The GOC is preparing its Intended Nationally Determined Contribution (INDC), which it plans to submit to the UNFCCC around July 2015. The MADS is in the process of integrating the SMAPs with its INDC.

The national government is also discussing how it can take advantage of additional financing opportunities, such as the Green Climate Fund (GCF). The DNP will most likely act as the focal point for the GCF. At the same time, the GOC acknowledges that international funding will not be enough to finance all needed climate actions. Thus, the DNP is interested in finding opportunities to leverage private sector investment, including through private-public

partnerships (PPPs). Colombia has relatively limited experience with PPPs, which were used to develop road infrastructure. DNP's main interest would be to promote PPPs in areas such as housing and urban development.

### ***National Climate Change Adaptation Plan (NCCAP)***

The NCCAP has the ultimate goal of reducing socio-economic and ecosystem risks and impacts associated with climate variability and change in Colombia. To this end, the GOC is developing a set of inputs to guide key economic sectors and sub-national governments to: (i) generate a better understanding of potential risks and actual impacts, including their economic value; (ii) take advantage of opportunities associated with climate variability and change; (iii) incorporate climate risk management into sectoral and territorial development; and (iv) identify, prioritize, implement, evaluate, and follow-up measures to reduce socio-economic vulnerability and exposure to climate events.

Efforts to date have centered on the development of methodological tools, such as the ABC for Climate Change Adaptation (which aims to homogenize concepts) and guidelines for the development of sectoral (under DNP's leadership) and regional adaptation plans (under MADS's leadership). IDEAM has supported these efforts by providing information about potential climate change impacts in key sectors/regions.

Key challenges regarding the NCCAP include:

- **Lack of an overall strategy:** There are few linkages across sectors or regions. In the case of the regions, plans have been developed where there was strong demand for MADS support, but not necessarily based on an identification of the areas that are more vulnerable to climate change.
- **Difficulties for coordination across jurisdictions:** MADS tried to create climate change nodes to facilitate coordination in regions across the country. Some of these remain active, but others did not work because Regional Environmental Corporations did not participate actively.
- **Linkages with Colombia's peace process:** The peace process is a top priority for the administration of President Juan Manuel Santos. When feasible, government efforts should aim to focus on areas that can contribute to this process, adding some complexity to the development of adaptation plans/actions. While not all climate change actions will necessarily be implemented in conflict zones, the GOC recognizes the opportunity to build synergies, for example by using renewable energies to provide energy in housing for displaced populations.

### **3. LOW CARBON RESILIENT DEVELOPMENT (LCRD) PROGRAM**

This program is funded by USAID and managed by the USFS. It started under EC-LEDS, but incorporated adaptation in response to a request from the GOC. Key staff and consultants are listed in annex 4.

The LCRD Program started in October 2014, with a two year duration, possibly expanding into a total of five years, through the current administrative mechanism or other. One of the LCRD Program's responsibilities is to help USAID/Colombia coordinate with other USAID programs (such as CEADIR) and facilitating their interaction with GOC representatives. The LCRD Program is working at three jurisdictional levels:

1. National level: Their main aim is to support the development of policies that facilitate sub-national efforts and mobilization of climate finance.
2. Department level: The main focus is to further support the department of Huila, which developed its Huila 2050 plan with USAID support, provided through different programs, including the Forest Carbon, Markets and Communities Program, and the Analysis and Investment for Low Emissions Growth Program. Assistance will now focus on the implementation of the plan in Pitalito, the municipality with highest coffee production in Colombia. The assistance will likely include technical assistance to make coffee farms and processing more climate smart, establish a payment for environmental services to conserve forested lands, and establish additional monitoring stations to observe trends in water availability.
3. Municipal level: Two municipalities have been selected based on GHG mitigation opportunities, vulnerability to climate change, and political will: Riohacha and Valledupar (annex 3 has a map of these two municipalities). The LCRD is also exploring opportunities to work in the municipality of Pasto, Nariño.

## 4. ACTIVITIES

### ***Activity 1. Sectorial Analysis of Measurement Reporting, and Verification (MRV), With Emphasis in the Housing and Territorial Development Sector***

#### Status/Needs

The GOC adopted an MRV system based on the IBM Cognos software. While the system is in place and has some information in it, it is not meeting its objectives. The information needed to assess progress in the implementation of the SMAPs is not available or regularly updated. In addition, sectoral agencies have difficulties obtaining the information that they would need to gauge progress from other stakeholders. Finally, responsibilities for data collection are fragmented (e.g., the Ministry of Housing is responsible for data on the number of houses built, but not for the type of technologies incorporated in them).

A key hurdle in Colombia is the lack of mandates for ministries/agencies/stakeholders to report. There exists an article in the recently passed clean energy legislation that can potentially compel reporting; however, it is important that the impending climate change law include reporting mandates. In addition, it is essential that the relevant agencies have the financial and technical resources to report their GHG emissions, whether structures are established in the law or provisions are simply made in agency budgets.

MADS is currently trying to redefine its MRV framework. It is trying to determine what would be the best way to reorganize the whole MRV framework, as well as to tackle the specific challenges of the sectors for which a SMAP has been prepared. Among these sectors, housing and territorial development, mainly land use planning in cities where the existing transportation network can be used to promote a denser growth, is a priority. Unlike the other sectors, housing does not have any sort of baseline or basic data from which the MRV can be built.

#### Proposed Activity

Without the ability to obtain the needed data for an MRV on a regular basis, it is difficult for MADS to make progress in MRV development and implementation. The governance issues are large. However, in the short-term, CEADIR can assist MADS consider important elements of an MRV system and see what data will be required from reporting agencies once they are compelled to report. In addition, with regard to the housing sector, CEADIR can assist with the definition of a carbon-equivalent methodology for the integrated Habitat NAMA. Specific tasks for the activity include:

- **Task 1: CarbonCounts Webinar.** A webinar for MADS staff and other interested stakeholders on CarbonCounts, the MRV system successfully used by Mexico and the US State of Massachusetts.
- **Task 2: Definition of GHG emissions calculation/methodology for housing.**
- **Task 3: MRV System for housing and Habitat NAMA.** If appropriate, work with Ministry of Housing and Ministry of Planning on sectoral MRV system for housing, in particular for planned communities. Specific emphasis would be on MRV for Habitat NAMA.

## Partners

The CEADIR team will collaborate with the MADS and the Ministry of Housing, Cities and Territories (MVCT)

## Deliverables

- Webinar on CarbonCounts held.
- Report on GHG emission calculation methodology for the housing and territorial development sector.
- Report on the MRV system for the housing and territorial development sector

## **Activity 2. Cost-Benefit Analyses for Ecosystems/Protected Area Conservation to Support Local Decision-Making for Better Land Use Planning to Reduce Climate Risks**

### Status/Needs

#### **Magdalena Ecosystem**

The Magdalena River Watershed is the main fluvial system of Colombia, covering 24 percent of the area of Colombia, and it is the main water supply for 30 million people (see map in annex 2)). Within the Magdalena watershed, 70 percent of the hydroelectricity and 90 percent of the thermoelectricity are generated. In addition, 90 percent of Colombia mining activities occur within the watershed. USAID, with the Nature Conservancy (TNC) and the Stockholm Environmental Institute (SEI), has been working in the quantification of climate change impacts in the watershed, and the evaluation of regional development scenarios considering water demands, land use changes, and hydropower developments. The Water Evaluation and Planning (WEAP) model was implemented in the watershed to evaluate these scenarios. USAID, with TNC, is developing a decision support system for strategic planning and dialog among main stakeholders in the watershed for the different sectors, including hydropower, irrigation, and fisheries, and communities whose livelihoods depend on the watershed.

USAID/Colombia is requesting CEADIR support on the quantification of economic benefits and impacts in the Magdalena Watershed for different development scenarios affecting the flow regimes with impacts on the flow dynamics of the lower Magdalena marshlands. Marshlands in the lower Magdalena are important ecosystems for flood control, biodiversity, and fisheries supporting the livelihoods of local communities.

### Proposed Activity

The proposed technical assistance will involve an economic valuation of the marshlands of the lower Magdalena and cost-benefit analyses for the ecosystem-based adaptation options being prepared with communities in the lower Magdalena. Specific tasks for the activity include:

- **Task 1. Identification of good and services provided by the marshlands.** This would include and in depth assessment of the use and non-use values of the marshlands including use of resources for economic purposes and livelihoods, ecological functions and recreational and research.
- **Task 2. Selection of the appropriate assessment methodology.** Based on identification of use and non-use values under Task 1 and the available information in the

field, a methodology to conduct the economic valuation will be selected. This can include contingent valuation, hedonic price, travel cost, market price among others.

- **Task 3. Analysis of the costs and benefits of adaptation options.** CBA will be conducted for adaptation interventions being developed with communities in the lower Magdalena.

## Partners

The CEADIR team will collaborate with the TNC, SEI, the Regional Corporation on Central Antioquia (CORANTIOQUIA), and other stakeholders involved in the program.

## Deliverables

- Report on the economic Valuation of the Lower Magdalena Marshlands
- Report on the cost-benefit analysis of adaptation options

## *Riohacha Municipality Ecosystems*

The LCRD Program has worked to identify potential climate change adaptation actions in Riohacha (see map in annex 3). To this end, it conducted a historical analysis of climate events, integrated them into a vulnerability assessment for urban and rural areas, and held two workshops with representatives from government, the private sector, and the community. Through this process, they identified two priority climate change adaptation issues:

1. Flooding in urban areas, particularly near the Laguna Salada (“Salty Lagoon”). The Laguna Salada is the largest water body in the municipality’s urban area. The lagoon was naturally connected to the Rancherías River delta, but was cut off by the construction of a main road. As a result, the ecosystem’s capacity to regulate water flows was significantly altered and there is now a high risk that the lagoon will flood, affecting nearby neighborhoods. In addition, poor populations tend to settle illegally in this risk-prone area. The risk of flooding is likely to increase as a result of climate change, particularly as more intense precipitations are expected to occur.
2. Drought in rural areas in an agricultural area called Trigrera-Chole. The Trigrera and Chole townships have medium-to-low availability of water resources. Because of the region’s limited rainfall, many of its rivers only provide water for productive activity (crops and livestock) intermittently. Average temperatures are projected to increase by 1-2°C over the coming 40 years, while average precipitation is expected to decrease, resulting in higher risks of drought.

The LCRD Program is interested in receiving CEADIR support to strengthen their assistance in terms of understanding potential climate change impacts and in valuing some ecosystem services that enhance resilience to climate change. Out of the two priority areas mentioned above, the CEADIR team proposes to work in Laguna Salada because of the commitment of the local government and the Regional Environmental Corporation (CORPOGUAJIRA) to restore this ecosystem, as well as the adjacent wetlands, recognizing that they provide a range of ecosystem services including flood protection. CEADIR's work would thus help to support these organization's investment decisions. The work on Trigerá and Chole could potentially be considered later, depending on the availability of resources and buy-in from local government and stakeholders.

## Proposed Activity

The proposed technical assistance to the GOC will focus on the preparation of economic analysis to estimate the total economic value of the ecosystem services provided by the Laguna Salada, as well as in helping the local and regional authorities to use this information to support their decision-making processes and potential investments to conserve the water body as part of its climate change adaptation strategy. Specific tasks for the activity include:

- **Task 1. Collection primary and secondary information.** Collect primary and secondary information on the natural and socio-economic characteristics of the lagoon and neighboring communities, as well as relevant plans and programs that CORPOGUAJIRA and the local government have in the region.
- **Task 2. Estimation of total economic value of the Laguna's ecosystem services.** Estimate the total economic value (including direct and indirect use values, as well as non-use values) of the Laguna's ecosystem services.
- **Task 3. CBA.** Estimate the economic costs and benefits of two or three interventions that could be carried out to support ecosystem-based adaptation in Riohacha, focusing particularly on measures to increase the Laguna Salada's capacity to regulate hydrological flows and thus reduce the risk of floods in neighboring communities.
- **Task 4. Dissemination of results with local and regional stakeholders.** Dissemination of results with local and regional stakeholders.

## Partners

The CEADIR team will collaborate with the municipal government of Riohacha, the Regional Environmental Corporation of La Guajira (CORPOGUAJIRA), and the USAID LCRD Program.

## Deliverables

- Report on the valuation of the ecosystem services provided by Laguna Salada and two or three ecosystem-based interventions.
- Policy brief summarizing the study's main findings in a language tailored for local and regional decision-makers.
- Minutes of meetings held during the preparation and dissemination of the economic analysis.

### **Activity 3. Review of Colombia's Computable General Equilibrium Model for Climate Change Assessments**

#### **Status/Needs**

The GOC conducted economic studies to support the preparation of the CLCDS. Both “top-down” and “bottom-up” models were developed to aid in the decision-making process for the implementation of low-carbon actions. The top-down modeling exercise is being conducted by the National Planning Department (DNP), which has developed a preliminary Computable General Equilibrium Model (CGEM). The CGEM aggregates all sectors of the economy analyzing cross-sectoral effects and provides results for each sector of the economy from the impacts of climate change. The model was built based on the GREEN (“General Equilibrium Environmental Model”) developed by the OECD (Organization for Economic Co-operation and Development), which quantifies the effects of policies in CO<sub>2</sub> emissions. The CGEM uses the results of the IPCC A1B scenario and covers 57 sectors of the economy, which were aggregated into 15 sectors including agriculture, mining, energy, commercial, industry, transport, and services, among others. The model predicts percent changes in GDP from the business as usual (BAU) scenario for each sector and the whole economy due to climate change (the results of the model are publicly available in the publication “Impactos Económicos del Cambio Climático en Colombia” and nine infographics covering different sectors).

The results of the model were shared with multiple stakeholders, who provided a series of recommendations, including the need to: (1) incorporate more sectors, and in particular climate change impacts on water availability and in water supply and sanitation infrastructure; and (2) develop the capacity to assess the economic impacts of climate change at a regional level.

The CEADIR team met with DNP officials on May 12, 2015, and from this meeting, the following needs and next steps to enhance the CGE modeling were covered:

- Current GCE model needs to be updated with data from IPCC’s 5th Assessment Report (AR5).
- Current model considers the sectors: energy (hydropower), transport, livestock, agriculture (rice, potato, maize and potatoes), forestry and fisheries. Therefore, DNP would like to expand to other sectors such as water and sanitation, energy distribution, and other agricultural value chains such as coffee, plantains, and cacao.
- DNP would like to adapt the CGE model to support assessments at the regional level, however, data availability is a concern for DNP.

- DNP is also looking to address and link the modeling effort to poverty reduction and the peace process.
- Another area of concern to DNP is to improve the communication around uncertainties that are inherent in this type of models.

## Proposed Activity

The proposed technical assistance to the GOC will involve providing peer review for the CGE model as currently developed. Specific tasks for the activity include:

- **Task 1: South-south assistance.** South-south assistance through a CGE modeling expert with experience developing, adapting, or applying a CGE model for LEDS policy analysis in another relevant country. This expert will consult with Ministry of Planning and modelers to learn about CGE model and will review and provide feedback. The CGE expert will provide capacity building/training courses to the DNP staff and climate change CGE model community of practice (modelers from other ministries, universities, projects, etc.).
- **Task 2: Peer review of modeling results.** An international climate change CGE expert will analyze current CGE model and provide peer review.

## Partners

The CEADIR team will collaborate with the Ministry of Planning.

## Deliverables

- Feedback/peer review on CGE model, including data availability and quality, appropriateness of the model, and guidance to adapt it to address the areas highlighted by DNP that are feasible with the data and resources available.
- Trainings to DNP and the CGE model community of practice (including staff from other ministries, universities, USAID and donor project, etc. as appropriate), focusing on cutting edge research on the use of this type of model to assess climate change impacts on key sectors and regions, as well as on how to use the model's results to support decision-making and communications with a non-specialized audience.

## **Activity 4. Cost-benefit Analysis for Mitigation Actions and NAMA Financing**

### **Status/Needs**

One element of the CLCDS is to develop sectoral low-carbon development plans (Sector Mitigation Action Plans – SMAPs) composed of actions, programs, measures, and policies to be prioritized based on their contribution to the sector’s development objectives, potential reduction of GHG emissions, economic, social and environmental co-benefits, and implementation. MADS indicated its interest in receiving CEADIR support to quantify the potential costs and benefits of specific interventions, including their potential co-benefits. MADS preliminarily identified the following interventions, which need to be confirmed with GOC agencies. The specific interventions on which CEADIR would work would be agreed upon by representatives from the GOC, the USAID mission, USAID/W and CEADIR.

#### **1. Transportation:**

- a. Non-motorized transport in cities. Several Colombian cities have advanced important programs to promote non-motorized transport, such as establishment of public bicycle programs and building of confined bike lanes. This activity is being developed by the DNP, with support from GIZ and USAID. Current discussions focus on the boundaries of the activity and its potential linkages with other areas, such as promotion of a denser urban development, improvement of public transportation, and opportunities for non-motorized freight transportation. In fact, the GOC is interested in developing this action because of its linkages to other activities, which, together with non-motorized transport, target emission reductions in urban areas. DNP has requested all municipalities to provide data about their programs to date, which will be integrated into a database of ongoing efforts. Based on that information, DNP will also define the roles of the national and local governments in promoting non-motorized transportation. The consulting firm Econometria conducted an economic analysis of the co-benefits of bike lanes (ciclovias). However, it focused only on health benefits. Other co-benefits that would need to be assessed, as has been done in cities such as New York City or Copenhagen, including the effects of non-motorized transportation on job creation, urban development, and business development. GIZ has contracted consultants to develop a potential MRV framework for this activity.

#### **2. Water and Waste**

- a. Utilization of Solid Waste Policy. Currently, MVCT collects data only regarding the coverage of landfill services, without considering other important issues, such as electricity generation from landfills or recycling. Several ministries and other

- stakeholders want to create an alliance for recycling to be overseen by an environmental observatory, integrated by MADS, MVCT, NGOs, and private firms. The alliance and observatory will aim to collect data and measure progress in improving waste management, with the aim of strengthening the knowledge base to assess GHG mitigation in the entire solid waste value chain. Econometria conducted a co-benefits evaluation of improved solid waste management, but only considered the benefits of integrating informal recyclers into formal labor markets.
- b. Optimizing the efficiency and resources of water treatment systems. Municipal wastewater treatment plants, particularly in small and rural municipalities, are frequently shut down because the municipality is unable to pay for the electricity needed to operate them. Thus, this potential activity would aim to facilitate improvements in energy efficiency and conversion to renewable sources to reduce such costs. This NAMA would also include other actions needed to enhance utilities' operations, potentially including actions on water conservation, metering, pricing and collection, reuse of gray water, distribution losses, and land treatment of wastewater.

### 3. Housing

- a. Financing schemes for eco-technologies in housing. The main financing scheme consists of building new homes that have integrated technologies that reduce electricity and water consumption. These technologies would result in lower utility bills, and, consequently, in the ability of households to acquire higher mortgages for new homes that, in addition to being climate-smart, are better quality. This approach was successfully adopted in Mexico.
- b. Identification of benefits in the formulation of the Habitat NAMA. MVCT had initially thought that this activity would only consider the development of new homes, but is currently integrating activities to manage urban development. The NAMA will need to be consistent with the 2009 official guidelines for the Consolidation of the Integrated Improvement of Neighborhoods Policy, which covers six main themes: (1) land use plans; (2) public services; (3) solid waste management; (4) housing; (5) mobility; and (6) public spaces. Current efforts are also focusing on determining the methodology to estimate the GHG mitigation potential of this activity. Opportunities to increase the GHG mitigation potential of this activity include the establishment of carbon sinks in the risk-prone areas from which populations are resettled to new homes; including passive constructions; GHG mitigation in public spaces; and improvements in mobility. This activity has funding from the Inter-American Development Bank (IADB). The national government will fund up to 80 percent of the cost of actions that are part of the NAMA and the local governments

will cover the other 20 percent. Co-benefits that need to be estimated for the NAMA include sustainable urban development and better community integration as a result of improved neighborhoods.

- c. Policy and regulation on sustainable construction. The main goal would be to support the development of policies and regulations that integrate climate change considerations into the development of new constructions.

#### 4. Industry

- a. Energy intensive and high carbon industries, such as cement, chemicals, foods and drinks; paper and printing; iron, steel and non-ferrous, which collectively represent 84 percent of the total emissions from the Colombian industry. The proposed technical assistance to the GOC will involve analyzing co-benefits and undertaking associated cost-benefit analyses for selected sectors and providing technical assistance with regard to co-benefit analysis of specific NAMA(s) (potentially including industry in general or specific sectors such as iron, steel and non-ferrous) and advising on financial structures of and financing for specific NAMA(s).

During the CEADIR visit to Colombia, the team also discussed the **energy generation sector** with MADS and other counterparts. MADS indicated this sector was an area for general SMAP support. An anticipated effect of climate change in the Andean region and the North of the country is a decrease of runoff levels, which may cause water distribution problems and a deficit of water in associated dams, which in turn would decrease hydro-energy generation. Colombia's generation portfolio is currently approaching 30% thermal and 70% hydro. If hydro-power is reduced, it will be important to ensure low-emission energy generation replacements. Working with Colombia to plan ahead for alternative energy generations scenarios could be and to help further develop the SMAP is an area in which CEADIR could engage.

Specific tasks for the activity include:

- **Task 1: Prioritization of SMAPS needing co-benefit assistance.** Prioritize SMAPS needing co-benefit assistance through consultations with USAID and counterparts.
- **Task 2: Rapid assessment of GHG emission reduction resulting from candidate NAMAs.** Consultations with USAID and counterparts and rapid assessment of GHG emission reduction resulting from candidate NAMAs (see annex 4) in order to select for assistance (most likely NAMA Habitat, NAMA Panela, NAMA Ganaderia Sostenible, and NAMA Industria General)

- **Task 3: Co-benefits analyses for selected SMAPs.** For selected SMAPs, undertake co-benefits analyses.
- **Task 4: Business plan for selected NAMAs.** Obtain data from NAMA developers. Evaluate technical emission reduction potential, co-benefits and co-costs for selected sectoral NAMAs. Review MRV plan (if any) and confirm what to measure, how to measure, when to measure, and who should measure. With information, in collaboration with NAMA developer, develop business plan to present NAMAs to potential public/private financiers. (The design process of NAMAs should pro-actively engage the private sector and remove barriers to its involvement. Public-private roundtables can establish a continuous communication process.)
- **Task 5: Develop financing structure for NAMA(s).** Determine financing structure for NAMA(s), with appropriate mechanism and if needed risk mitigation element for each action/activity within the NAMA. Financing may be combination of equity and debt. Financing flows will come from domestic government(s), domestic development banks, private sector, and, if appropriate, international funds. Risk mitigation elements (to attract/secure financing) may include performance guarantees and partial credit risk guarantees. Financing structure must be specific to NAMA and its actions; not that each action must have an identified implementer(s).
- **Task 6: Establishment of MRV for NAMA.** If MRV does not exist for selected NAMA, work with NAMA developer and other donors/stakeholders to establish MRV for NAMA (if not for whole sector). GHG reductions of NAMA actions must be measured and reported transparently to attract and maintain financing flows. (See activity I on MRV).

## Partners

The CEADIR team will collaborate with USAID/Colombia, MADS, and, depending on SMAP/NAMA, will collaborate with MVCT, DNP, UPME (Housing/Habitat); FEDEPANELA, MADS, MADR, GEF, PNUD, FAO (Panela); MADR, PNUD, BM, FONDO ACCIÓN, UK, GEF, Mesa de Ganadería Sostenible, CIAT (Ganadería); MCIT (Industria); and MT (Transporte) MME, UPME, CREG (Energy).

## Deliverables

- Co-benefit analysis/analyses for up to two selected SMAP/sectors
- Co-benefit analysis for up to two selected NAMAs
- Business plan for each selected NAMA
- Financing structure proposed for each selected NAMA

## Annex I Proposed Technical Assistance Timeline

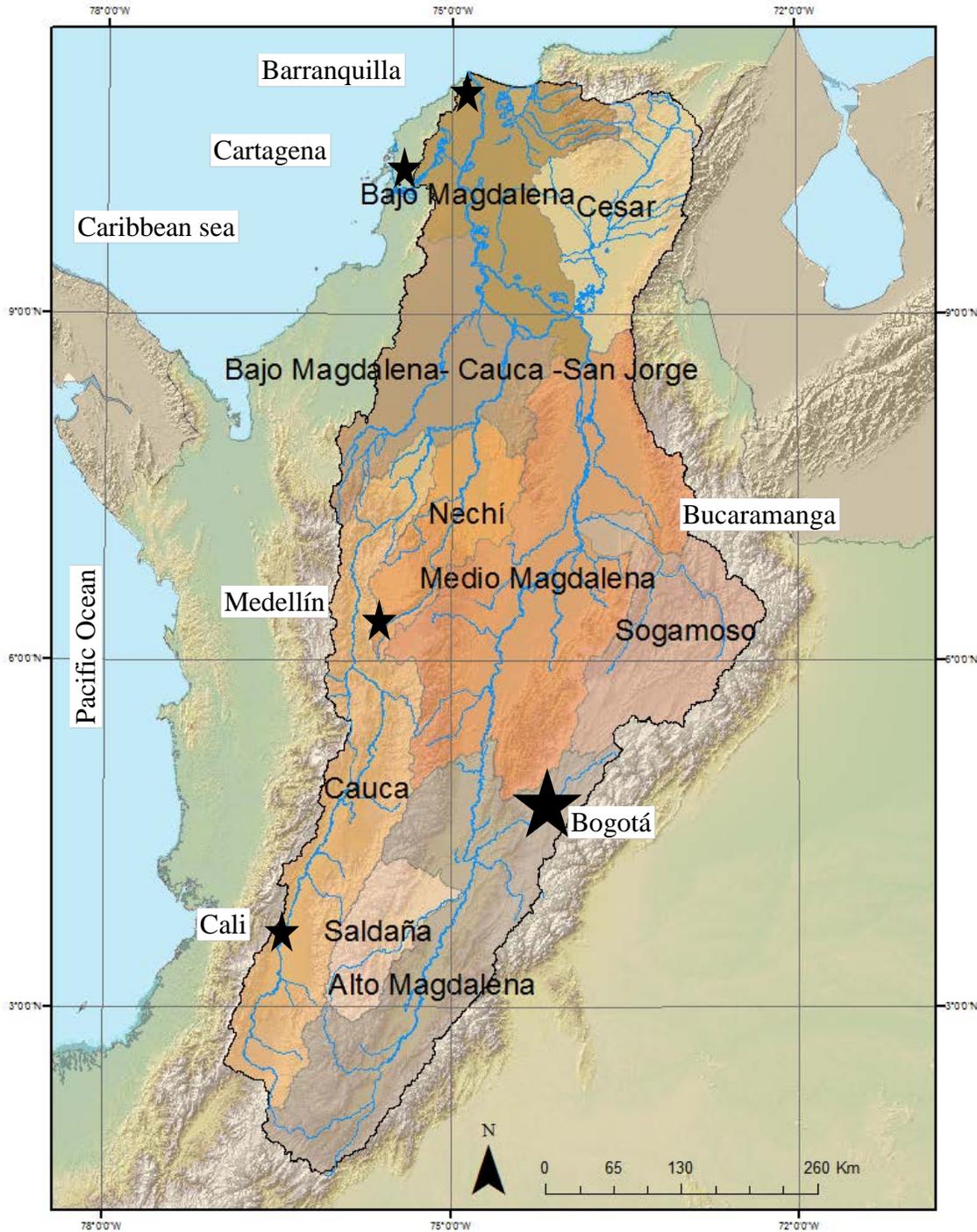
**Table I. Proposed Timeline for CEADIR Assistance in Colombia**

ACTIVITY	2015		2016				
	April-June	July - Sep	Oct.-Dec	Jan-Mar	April-June	July-Sep	Oct-Dec
<b>1. Sectorial analysis of Monitoring, Reporting, and Verification (MRV)</b>							
Task 1: CarbonCounts Webinar							
Task 2: Definition of GHG emissions calculation/methodology for housing.							
Task 3: MRV System for housing and Habitat NAMA.							
<b>Activity 2. Cost-benefit analyses for ecosystems</b>							
<b>Magdalena Ecosystem</b>							
Task 1. Identification of good and services provided by the Marshlands.							
Task 2. Selection of the appropriate assessment methodology.							
Task 3. Analysis of the costs and benefits of adaptation options.							
<b>Riohacha Ecosystem</b>							
Task 1. Collection primary and secondary information							
Task 2. Estimation of total economic value of the Laguna’s ecosystem services.							

ACTIVITY	2015		2016				
	April- June	July - Sep	Oct.- Dec	Jan- Mar	April- June	July- Sep	Oct- Dec
Task 3. CBA of 2 or 3 interventions							
Task 4. Dissemination of results with local and regional stakeholders.							
<b>Activity 3. Review of Colombia's Computable General Equilibrium Model</b>							
Task 1: South-south assistance through CGE modeling expert							
Task 2: Peer review of modeling results							
<b>Activity 4. Cost/benefit analysis for mitigation actions and NAMA Financing</b>							
Task 1: Prioritization of SMAPS needing co-benefit assistance							
Task 2: Rapid assessment of GHG emission reduction resulting from candidate NAMAs							
Task 3: Co-benefits analyses for selected SMAPS							
Task 4: Business plan for selected NAMAs							
Task 5: Develop financing structure for NAMA(s)							
Task 6: MRV for NAMA							

Note: Dark blue indicates the main activities in this workplan; light blue indicates the main tasks under each activity.

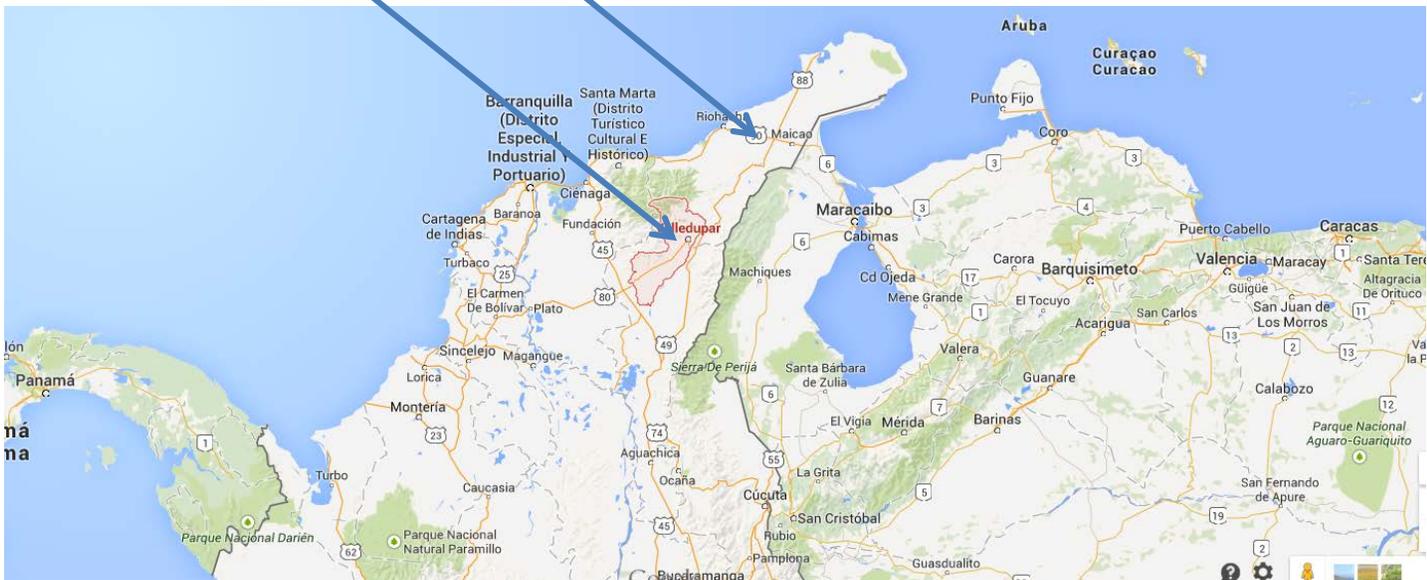
## Annex 2. Map of Magdalena River Watershed (source: TNC)



### Annex 3. Location of the Riohacha Municipality

**Riohacha, Guajira, Colombia**

**Valledupar**



Source: Google Maps.

Note: Cities selected based on the CDCS 2014-18.

## Annex 4. Status of NAMAs (Source: MADS)

 					
<b>LISTADO DE NAMAs EN CURSO</b>					
Fecha: Mayo 13, 2015					
SECTOR	NAMA	ESTADO	ACTORES	PARTICIPACIÓN LECB - UNDP	ALINEACION CON ACTIVIDADES ADELANTADAS POR LCRD-USAID
<b>Agricultura</b>	<b>NAMA Panela - Mejora de la eficiencia energética en trapiches</b>	Formulación	FEDEPANELA – MADS – MADR -GEF - PNUD - FAO	Lidera formulación	
	NAMA Café	Formulación	PNUD – FEDECAFE – MADS - MADR	Lidera formulación	
	<b>NAMA Ganadería sostenible</b>	Identificada	MADR - MADS - PNUD - BM - FONDO ACCIÓN -UK - GEF - Mesa de Ganadería Sostenible - CIAT	Acompañamiento técnico	
<b>Energía</b>	Sustitución de Refrigeradores Domésticos	Formulación	CAF-MADS - ANDI - CCAP -MME -UPME	Acompañamiento técnico	
	Eficiencia Energética en Alumbrado Público	Pre-formulación	Findeter - BID - UNAL - UPME - MME	Acompañamiento técnico	
	Eficiencia Energética en Hoteles	Formulación	MADS - Perspectives - Bancoldex	Lidera formulación	
	Eficiencia Energética en Edificaciones Públicas	Identificada	UPME – PNUD - GEF - MADS	Acompañamiento técnico	
	<b>Energización con Fuentes de Energía Renovable en las ZNI</b>	Formulación	IPSE - MME – UPME – Carbon Trust - OLADE	Acompañamiento técnico	
	<b>Gasodomésticos</b>	Pre-formulación	MADS - Gas Natural Fenosa	Lidera formulación	
<b>Transporte/ Dillo Urbano</b>	NAMA TOD - Desarrollo Orientado al Transporte	Formulación	MVCT-MT -MADS – DNP-Findeter- CCAP	Seguimiento	
<b>Transporte</b>	Transporte de carga	Formulación	MT - GIZ Transfer	Seguimiento	
	Transporte no motorizado	Formulación	MT-GIZ Transfer	Seguimiento	
<b>Industria</b>	Metalmecánica	Formulación	MADS - MCIT – PTP	Seguimiento	
	<b>Industria General</b>	Pre-formulación	MCIT - MADS - USAID	Acompañamiento técnico	El consultor de LCRD en industria lidera la formulación de esta NAMA y se esperan que la NAMA sea la herramienta implementadora e integradora de las medidas del PAS de industria. Se requiere calcular la proyección de reducción de emisiones y la estructuración financiera de la misma.
	Siderurgia	Formulación	MADS - MCIT – PTP	Seguimiento	
<b>Residuos</b>	NAMA de Residuos Sólidos	Formulación	MVCT – MADS – CCAP	Seguimiento	
<b>Vivienda</b>	<b>Habitat Sostenible</b>	Pre-formulación	MVCT - DNP - MADS - UPME - USAID	Acompañamiento técnico	El consultor de LCRD en vivienda lidera la formulación de esta NAMA. La NAMA está enfocada a medidas integradoras del desarrollo urbano y vivienda. Se requiere definir la estructuración financiera de la NAMA y el cálculo de cobeneficios de las medidas que integran la NAMA.
<b>Forestal</b>	NAMA forestal	Formulación	MADS - Optim	Acompañamiento técnico	

## Annex 5. Contact Information

Title		Contact Information
<b>DNP</b>		
Andres Camilo Alvarez		acaalvarez@dnp.gov.co
Alvaro Martinez		amartinezm@dnp.gov.co
<b>MADS</b>		
Jose Manuel Sandoval	ECDDBC Coordinator	jsandoval@minambiente.gov.co; (57) 3133876142
Natalia Gutierrez	Consultant	ngutierrez@minambiente.gov.co; (57) 312-311-1265
Sebastian Carranza	Specialist	scarranza@minambiente.gov.co; (57) 3005556744
<b>Ministry of Mines and Energy</b>		
Alex Caña	Senior Advisor	afcanas@minminas.gov.co
<b>Ministry of Housing and Territories</b>		
Name		
<b>USAID/Colombia Clean Energy Program (CCEP)</b>		
Jose Eddy Torres		(57 1)345 6563; joseddy.torres@ccep.co; www.ccep.co
<b>Findeter</b>		
Jessica Jacob	Director CSR	(57 1) 6230311/88 Ext.1525; jpjacob@findeter.gov
<b>Inter-American Development Bank</b>		
Juan Pablo Vallejo	Sector Specialist	Vallejo Arroyave, Juan Pablo <jpvallejo@IADB.ORG>
<b>USAID/UFS LCRD Program</b>		
Sandra Garavito	General Director	Sandra garavito <sgaravito@lcrdcolombia.org>
Beatriz Mogollón	Environmental Scientist	
Juan Felipe Franco	MRV	
Juan Pablo Borda	Clean Energy	
Oscar Galvis	Risk Management and Adaptation	
Lina Rueda	Communications	
Sebastián Velázquez	Transport	
Ernesto Betancourt	Coordination of Sub-national Initiatives	
Ana María Mogollon	Coordination of National Initiatives	ANA MARIA MOGOLLON <amogollon@lcrdcolombia.org>