

# Formulation of a Nationally Determined Contribution to Climate Change Mitigation in Colombia

Defining a Nationally Determined Contribution to Climate Change Mitigation is a process that requires several rounds of political negotiations and strong technical and scientific data and information. In countries like Colombia, this process is particularly sensitive considering the requirements of economic development, and overcoming poverty and vulnerability

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**T**he Colombian INDC background can be traced back to 1993, when the National Environmental System was created by the Law. However, it was only in 2011 that the National System for Climate Change was established. This system is composed of four strategies: the National Plan for Climate Change Adaptation, the Strategy for Financial Protection Against Disasters, the National Strategy to Reduce Emissions from Deforestation and Forest Degradation (REDD) and, the Colombian

Low-Carbon Development Strategy (CLCDS).

The modeling effort, complementary studies and discussion processes that led to the definition of the Colombian INDC were developed within the CLCDS framework. This work started even before the creation of the National System for Climate Change (2010) and was a joint effort led by three parties. In the first place, two national ministries: the Ministry for Environment and Sustainable Development (MESD) and the Ministry of Foreign Affairs (MFA); secondly,

the National Planning Department (NPD), a technical agency of the Colombian government; and academia, represented by researchers of different schools at Universidad de los Andes (Uniandes), with the support of other international and national research centers. In order to facilitate the identification, evaluation, and the subsequent adoption and implementation of the mitigation/adaptation measures, other public agencies, business associations and civil society were involved and heard by the three leading parties

along the whole process. This was a central pillar of this work even though parties felt that discussions were not sufficient enough to listen to all relevant actors.

This paper aims to summarize the process that led to the identification of the Colombian INDC. We focus on the definition process of the mitigation targets. The definition of the adaptation goals, a clear interest of the Colombian government, as it was pointed out in Paris, followed a different track and resorted to more 'classical' studies. It is important noting that the CLCDS was part of a coordinated action by the MAPS Programme, aimed to "establish the evidence basis for long-term transition to robust economies that are both carbon efficient and climate resilient"<sup>1</sup>.

The remaining part of the paper is divided into four sections. In the first one, the work done to define the sectoral future scenarios and its mitigation options is presented. The outputs of this process were used as main input for the production of the sectoral action plans that are briefly described in the second section. The third section summarizes the process followed to define a nationwide mitigation goal, which then became the Colombian INDC. In the last section, some concluding remarks are reported.

### **Sectoral Future Scenarios and Options for Low-Carbon Development**

The CLCDS is an initiative of the MESD derived from the mandate of the Colombian government. MESD is in charge of carrying out the political process within the government and also with the stakeholders and civil society. However, in the case of

Climate Change Mitigation, these political processes require huge amounts of technical information and scientific evidence to support the decisions to be taken. Simultaneously to the start of the CLCDS, two institutions were conducting studies related to the Climate Change in Colombia and relevant to the strategy: National Planning Department (NPD) and Universidad de los Andes. NPD is in charge of the strategic planning of the country through the design, orientation and evaluation of the Colombian public policies. As part of its functions, NPD was developing a CGE model to assess the impacts that climate change might have on the Colombian economy. Within this study, NPD's goal was to identify the potential losses in GDP as a consequence of changed climate trends. On the other hand, in 2010, Uniandes was conducting several studies relating to the construction of marginal abatement cost curves for the Colombian energy sector. These studies allowed the University to have a research group with experience and skills in both sectoral activity modelling and climate change abatement analysis. That is how NPD and Uniandes joined MESD to support the political process with strong technical and scientific information. MESD decided that, in order to implement any policy recommendation regarding the mitigation of Climate Change in Colombia, the stakeholders and civil society should be involved. Furthermore, MEDS recognized that the formulation of sectoral development strategies was out of its scope and beyond its responsibility as a ministry, even if these strategies aim to contribute to a better environment. Eventually, a wide and long discussion process

with the participation of other sectoral ministries, stakeholders and civil society was undertaken to formulate the CLCDS. This approach improved the quality of the outputs and contributed to recognize the feasibility of the identified actions.

MESD concentrated its resources and efforts in accompanying the sectoral ministries in order to formulate the so-called Sectoral Action Plans. It provided them with information about the purpose of the CLCDS as well as the action to reach it. The focus of the first research stage was the construction and evaluation of a set of sectoral mitigation action portfolios. Within these portfolios (one per sector), each identified mitigation action was characterized in terms of abatement potential, investment and operation costs, benefits, implementation timing and possible barriers. Simultaneously, and aiming to reduce the potential opposition to the process and to improve the quality and confidence on the information obtained through the modelling exercises undertaken by Uniandes, stakeholders, business associations, academics and civil society were invited to participate. Two groups of people were created: a steering committee and a Scenario Building Team (SBT).

The steering committee was composed of the directors and senior representatives from different organizations. This group was in charge of giving the mandate to the SBT to provide and validate the information used by the models and to build the scenarios. In order to get the needed political support for adopting the mitigation actions identified during the research phase, this group was informed about the modeling process, the results and its implications



through their representatives in the SBT. This committee attended two “High Level” meetings, convened either by the Colombian President or by the Ministry of Environment. The first meeting was held on February 2012, during which the mandate to convene the SBT was obtained. The second meeting was held on August 2012 and then the results were shared.

Members of the SBT were invited as experts on the technical details of each sector. Within the SBT, one group for each sector was created: energy, transportation, manufacturing industries, housing, agriculture and waste. Additionally, a group of macroeconomic experts was set up to ensure the consistency, across all sectors, of the expected future socio-economic scenarios. Each sectoral SBT included agents from several origins. For example, the energy SBT included experts from power utilities, oil and gas companies, coal miners, industries and other energy consumers, ONGs, universities, and the Ministry of Mining and Energy.

As its name indicates, the SBT was devoted to provide the information used to characterize and model several plausible future scenarios. The SBT’s meetings were convened to discuss and reach agreements about assumptions and data. Some of the agreements included: definitions regarding what is and what is not part of the baseline, technological parameters of the productive processes, mitigation opportunities within each sector, stimulus and barriers for the implementation of mitigation actions, timing for the implementation, among others. The SBT’s meetings were also focused on the scenario for the validation of results and their publication.

Five SBT meetings were held over eight months. Involving society in the modeling process was a strenuous job for the modeling group based at Uniandes. However, once this stage was overcome, the outputs benefited from the fact that they rely on public data and assumptions agreed with the representatives of the Colombian society. These ad-

vantages, of course, did not exempt from possible discussions and even controversies when the final INDC was defined.

As the main goal of this stage was to endow the sectors with information regarding their opportunities to reduce the expected GHG (Greenhouse Gas) emissions avoiding their impact on the economic development, research was conducted and the outputs obtained at the sectoral level. In order to facilitate the communication and prioritization of mitigation measures, the obtained mitigation portfolios took the shape of marginal abatement cost curves (MACC or MAC curves). Indeed, the MACC were the main input used by the MESD and the sectoral ministries to formulate, at a later stage, the Sectorial Action Plans for climate change mitigation (PAS for its Spanish acronym). These MACCs were calculated using 2010 as base year and considering a 30-year time span. Despite the importance of the MACCs, they were not the only products obtained during this stage

of the study. As mentioned, the detailed description of each mitigation action was provided.

This macroeconomic group was in charge of the definition of the cross-sectoral assumptions. This group worked to produce the forecasts that were used by the sectoral teams as inputs for their models: GDP growth, sectoral participation within this growth, and population scenarios. NPD usually provides official forecasts for these variables. However, these are fairly detailed for periods up to one decade and, more generally, for longer times. Uniandes and NPD worked together to produce the required long-term forecasts. Researchers did a comparative and clustering analysis to help to illustrate the impacts of GDP growth scenarios on the country. This analysis consisted in finding countries that, over several time periods ago, looked like Colombia today in terms of income per capita. This exercise helped to construct macroeconomic scenarios and gave a very useful insight for the sectoral groups.

### Sectoral Action Plans

After concluding the studies to identify the sectoral future scenarios and the options for low-carbon development, MESD and the other sectoral ministries started producing the Sectoral Action Plans (PAS) for Climate Change Mitigation. They were formulated over 2013 and 2014, and used the MACC produced in the previous stage of the CLCDS as main input. PAS aim to identify the sectoral mitigation priorities as well as policies and implementing means to facilitate its inclusion in the sectoral planning and even in the National Development Plan.

Ministries of Transportation, Energy and Mining, Commerce, Industry and Tourism, Agriculture and Rural Development and Housing, Cities and Territory formulated a total of eight PAS. This formulation was led by experts on climate change within each ministry. Most of them participated in the studies to identify the sectoral future scenarios and mitigation opportunities.

PAS are not only a list of mitigation actions, they also include the formulation of a group of policies and programs devoted to mitigate the GHG emissions within each sector. The analysis contained in each of the mitigation action plans was complemented by identifying their intrinsic co-benefits and the coherence with the ministerial policies for the development of the sectors. Partly, as a result of this work, the National Development Plan of the re-elected President Juan Manuel Santos included a chapter named “Green Growth” where such issues as climate change mitigation were included as priorities for the development policies of the productive sectors.

This was the vehicle used to transfer, or at least share, the leading role in mitigating climate change from MESD to the sectoral ministries. However, and despite the fact that most of the PAS formulation started from technical analysis and scientific results, the final outputs were more a sort of political arrangements and policies than concrete mitigation goals.

### From a Sectorial Perspective to a Nationwide Mitigation Goal

Until 2014, mitigation studies and political processes were assessed

with a sectoral approach, despite the fact that all the sectors within the Colombian economy were included. In that year, priorities were shifted towards the identification of a national GEI abatement goal to be presented to the international community, as agreed in the decisions of the previous Conference of the Parties. The sectoral approach is still prevalent, since it is clear that implementation will be done at this level, and it will even require an additional disaggregation towards the geographical regionalization.

In the time span between the sectoral studies and this new endeavor, some significant issues appeared. In the first place, IDEAM was producing the first Biannual Updated Report (BUR). This BUR contains the National Inventory of GHG for the years 2010 and 2012. Since the sectoral studies were carried out using the latest available inventory (2000 and 2004), the emission values for the base year (2010) was obtained using models or by following the inventory methodology to produce the information required. It is clear that the base year emission values used to calculate future emission scenarios must be exactly the same as the ones reported on the BUR.

Secondly, international energy prices fell dramatically during this time. Hence, the heavy dependence of the Colombian economy on oil and coal exports generated the need to recalculate growth scenarios. All the sectoral models were adjusted to better represent the expectations of NPD. Additionally, the time horizon was extended up to 2050. This change has allowed to account for new technologies that are expected to be available within the next decades.

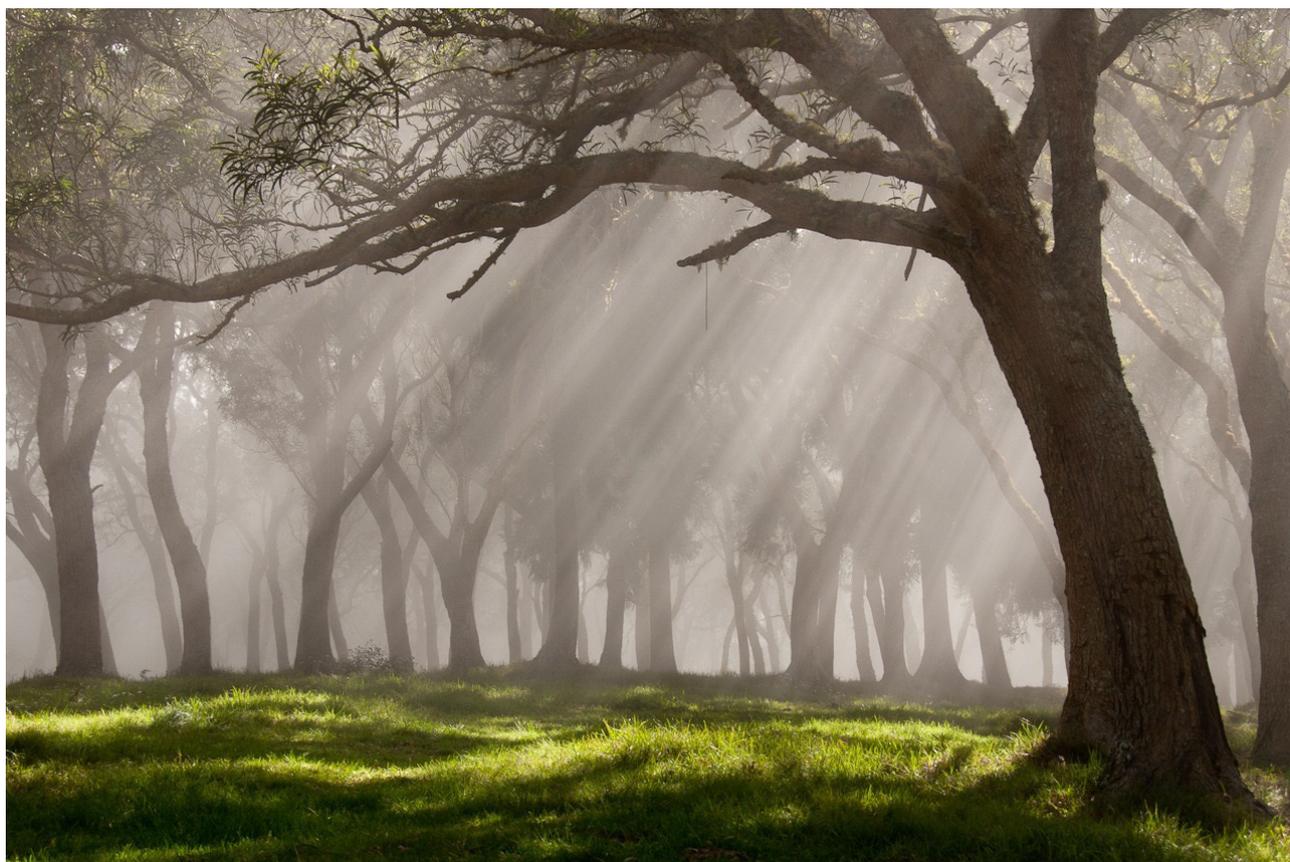
Thirdly, during the sectoral studies

and considering that REDD strategy was devoted to identify mitigation opportunities in the forestry and land use change (FOLU) sector, this was separated from the CLCDS studies. However, being FOLU the bigger emitter in Colombia, it was imperative to include it into the na-

ests, pastures and crops. Researchers at Uniandes worked with partners at IFPRI in order to cover all emission reduction and mitigation actions in the AFOLU sector.

The Energy modeling group was also strengthened by the connection between Uniandes and the Mining and

search stage of the CLCDS a national emission baseline was constructed. This was obtained from the aggregation of the sectoral baselines where double accountability was avoided. The mitigation actions were recalculated and the portfolio was extended to include some new NAMAs, some



tional mitigation goal using the same approach. To do so, the studies for the Agricultural sector were re-engineered and the group was reinforced by the incorporation of the researchers from the International Food Policy Research Institute (IFPRI). IFPRI was using an array of models to assess the changes in the use of soils and their assignation between for-

Energy Planning Unit (UPME). The latter is a branch of the Ministry of Mining and Energy and is in charge, among others, of the official energy statistics and scenario forecasts.

All the changes mentioned above and some other requirements regarding the structure of the INDC were assessed during a second wave of research. In sum, during this re-

actions from the Clean Development Mechanism, and some other actions and quantifiable policies from the PAS. In this case, all the emitter sectors were included (specially the newly added FOLU sector). The extended portfolio was used to feed a scenario building tool, specifically developed for this study. Such tool allowed to construct several national

mitigation scenarios by adding and tuning mitigation actions. Each mitigation scenario was characterized by its abatement path over time and the curve of fixed and variable costs. This information was used by the NPD, with the support of Unian-des, to calculate the macroeconomic impacts of the investments required to implement each scenario and the savings derived from the improvement in production efficiency. All this information was used for the Colombian Government to select the unconditional and conditional commitments that were presented to the international community before COP21. This final process went through a very intense participation by the stakeholders in a renewed interest regarding the commitment that the country was going to subscribe to. This renovated interest coincided with the imminence of the decisions that were going to be taken during COP21. The closer the international community was getting to the consensus that during COP21 a global agreement was going to happen, the greater the interest of the national stakeholders in the process to define the Colombian goal. Some supplementary analyses were also performed during this stage. In order to facilitate the discussions regarding the fairness and ambition of

the Colombian mitigation scenarios, a theoretical mitigation scenario required by science and equity was calculated. With a view to facilitate the discussions on implementation, some preliminary proposals for sectoral allocation of mitigation goals were formulated. Finally, a review of available policy instruments and market mechanism that can be used for the implementation of the required mitigation actions was performed, and a preliminary proposal for the Colombian government was put forward.

### Conclusions

A national goal for GHG mitigation was defined for the very first time in Colombia. Next step is to set out sectoral and regional mitigation efforts in order to honor this commitment. Defining these efforts is a complex process, involving issues such as income, employment, and sectoral and regional competitiveness. This creates uncertainty in achieving the preset objectives and in the actions of the different agents configuring what in game theory is known as the prisoner's dilemma. Each of the GHG emitter sectors is tempted to assume that early action will bring them a competitive loss compared to other sectors that will surely not take

the actions required, or those who wait to pursue such action. On the other hand, the competitive sectors will have the same reasoning to deal with this situation, and as a result none of the "players" will decide to invest to achieve the set target under the pretext of not losing competitiveness, when cooperation among sectors is a strategy that provides benefits to all.

Finding the instruments and mechanisms to ensure that all sectors join their efforts to achieve the proposed goal in an economically-efficient manner is imperative. Mechanisms such as a carbon market and carbon taxes will contribute in this direction. Whilst these schemes are implemented, some instruments designed to achieve higher efficiency in economic activity must be tried; so must the elimination of subsidies and other market-distorting measures.

The implementation of regional mitigation plans requires efforts in communicating decisions and commitments, evaluating local and regional impacts, removing barriers and creating incentives (hopefully aligned) to deploy actions that can lead to the planned goal.

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<sup>1</sup> The Mitigation Action Plans and Scenarios (MAPS) is a collaboration amongst developing countries that contributes to ambitious climate change mitigation taking into account economic development and poverty alleviation (<http://www.mapsprogramme.org/category/about-us/background/>)