



RESEARCH PROGRAM ON
**Climate Change,
Agriculture and
Food Security**

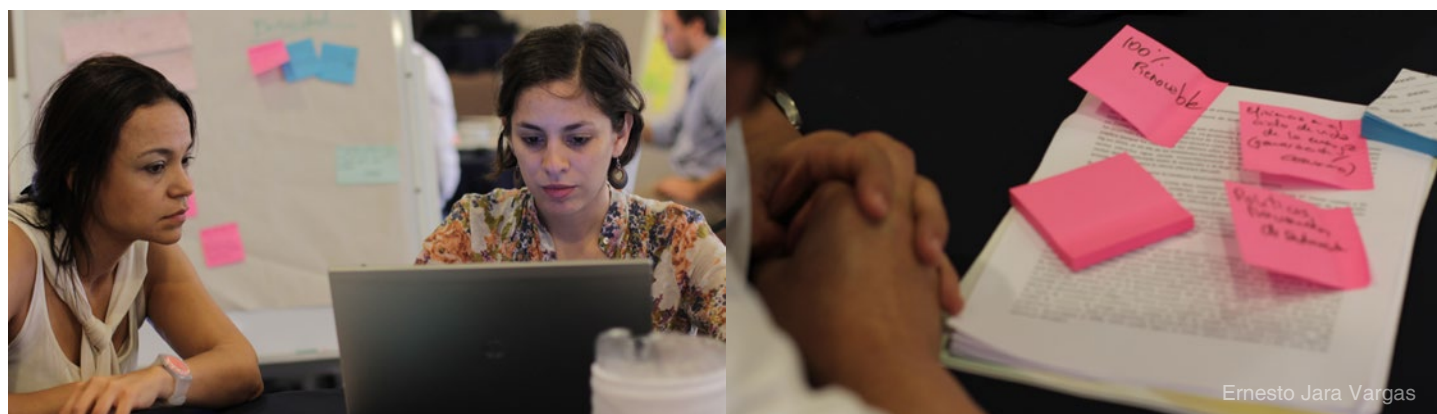


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Shifting the paradigm: Narratives of the future guide the development of Costa Rica's INDC

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KEY MESSAGES

- The use of future scenarios has proven to be an effective tool for dialogue when stakeholders from multiple sectors and decision levels need to come to an arrangement and model results do not cover enough scope and depth of the needed debate (Vervoort et al, 2014).
- Projections of future emissions based on historical data are less suitable when the conditions in which they are to be implemented are likely to change. Instead, back-casting towards the present from future scenarios based on drivers of change is a useful method to explore alternative pathways of development and test the apparent resilience of mitigation measures (Kok et al, 2014; Vervoort et al, 2014). In the case of Costa Rica's INDC, model results showing forecasts were compared and contrasted with narratives of future scenarios to increase insight on possible future changes that could affect mitigation measures.
- By not only looking at emission reductions, but also at possible economic, political, environmental and social development as a whole, experts and decision makers were able to identify the preconditions needed to create a country in which emissions can be reduced, as well as obstacles that might be encountered along the way.
- This systemic approach also shed light on the collateral effects of measures to reduce emissions in one sector on other sectors. This was important since an INDC wants to focus on strategies that have an impact on several sectors.

This policy brief summarizes the process and main results of the development of Costa Rica's INDC through a participatory process in which the building and use of future scenarios was the first step in a national dialogue to define, test and improve mitigation measures to lower emissions of greenhouse gases.

LIMITATIONS OF FORECASTING TO PLAN A CHANGE OF PARADIGM

The development of Nationally Intended Contributions (INDC) has been a complicated task for governments worldwide. Apart from the technical and institutional challenges of defining the history of greenhouse emissions and modeling probable impacts of projected lower emission strategies, each country's INDC should include a public consultation process.

In 2007, Costa Rica already established the aspirational goal to become carbon neutral before 2021. With this goal in mind, and considering what can be achieved after that, projections calculating the impact of low emission strategies based on historical data were not enough.

Projections were insufficient, because these forecasts were based on social, economic and environmental assumptions such as the demand for electricity, consumer patterns, but also private and public sector investments and the availability of natural resources, which might change in the upcoming years, considering the complex contexts these conditions are determined by. A disruptive



Participants of the Scenarios Workshop. Photo: Ernesto Jara Vargas

change in technology could influence public and private transport as well as renewable energy storage capacity; Extreme weather events could change global markets and local food prices. Increased poverty could change the use of natural resources, such as firewood, and therewith greenhouse gas emissions; In the case of Costa Rica certain changes, particularly in lifestyle choices and private sector investments, actually have to be proactively catalyzed and driven in order to achieve the carbon neutrality goal.

In order to understand how a significant change in paradigm could be made, Costa Rica's INDC team of the Ministry of Environment (MINAE) decided to create and explore future scenarios detailing possible pathways of development, and analyze what they could mean for emission reductions. Through this process they would not only explore positive scenarios, but also possible futures in which circumstances to reduce emissions are not that favorable.

By looking at narratives instead of numbers the INDC team managed to start up an accessible national dialogue with stakeholders from different levels and disciplines, not necessarily all familiar with climate change terminology and concepts.

USING FUTURE SCENARIOS TO TEST AND ROBUST MITIGATION STRATEGIES

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), in collaboration with the United Nations Development Program (UNDP) and the Climate Change Department of the MINAE, worked with national high level experts from the government, private sector, research organizations and social movements

to create multiple future scenarios of Costa Rica under climate change in 2030. These scenarios are based on future drivers of change for livelihoods, environment and emission reduction in all 5 major emission sectors; agriculture and livestock, transport, electric energy, waste, and forests.

The work involved experts reviewing current mitigation strategies to reduce emissions, suggesting new ones, then developing multiple narratives of plausible futures based on drivers of change relevant to all sectors, and finally using these scenarios to test and improve suggested mitigation measures in order to strengthen their robustness towards future uncertainties.

The scenarios were based on previous work by CCAFS in December 2013 when key stakeholders from Central America created four diverse future scenarios of agriculture, environment and livelihoods in 2050. The highly relevant and uncertain drivers of change they identified were the institutional capacity of the state (high, low or social and territorially unequal), the availability of water resources (high or low), markets (participatory, non-participatory, regulated or not regulated markets) and distribution of wealth (equal or unequal, driven by the state or the market).

A mathematical program called OLDFAR, developed by CCAFS, helped to determine the most diverse set of scenarios. The four narratives for Central America were adjusted up to 2030, which is the time horizon used by most INDCs, and rewritten to make sure they were relevant for key issues regarding emission increase or reduction in the context of Costa Rica, covering all five mayor emission sectors.

SCENARIOS OF COSTA RICA IN THE YEAR 2030

'Without rules there is no paradise' is a world where weak government capacity and a lack of regulations give freeway for informal practices and environmental exploitation. Deforestation increases, marine ecosystems deteriorate, water resources dry up, and so does the generation of hydroelectric energy. Costa Rica loses its green image as tourism goes down. Its competitiveness in industries decreases and the economy starts depending again on an agro-export economy managed by only a few actors.

Rising sea levels and low rural economic development create an exodus towards the cities, which become overpopulated, traffic jammed, and suffer serious waste management issues. Food insecurity and the lack of water generate social and economic conflicts, as well as health problems.



Illustration of the scenario. 'Without rules there is no paradise' Image credits: Laura Astorga

'Storm without water' is a world where corruption, despotism and the government's consent towards greater interests of the private sector has increased poverty and social unrest. Although water resources are abundant, access is controlled by transnationals and local mafia. Public schools and healthcare have been cut back to finance the militarization of the police. Public transportation is in poor condition and prioritized for laborers. Electricity is available to all, although expensive. Forest lands are expropriated since their conservation is key to maintaining water resources. Agricultural production has been reduced to the point of Costa Rica having to import most of its food. Cities have grown and slums are plentiful, producing excess garbage and waste, which is very badly managed.

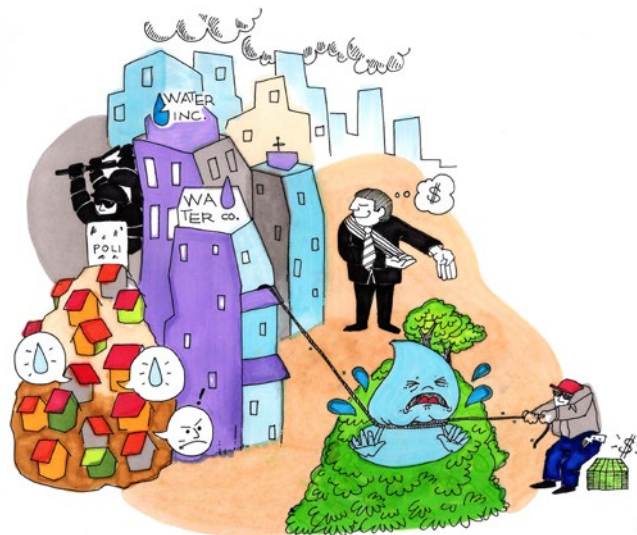


Illustration of the scenario. 'Storm without water' Image credits: Laura Astorga

'Hipster Republic'; The Sweden of Central America is a world where citizens are satisfied with the effective implementation of the state policy that promotes research, innovation and technological development. Costa Rica is a top destination for sustainable tourism, with benefits shared by communities and strengthening measures to mitigate and adapt to climate change.

State supported agricultural production is diversified, including high urban agricultural production, a strong link with the production chain, and an efficient system of food reserves. Water resources are well managed and renewable energy is the norm. A water project in the northern drier region ensures irrigation for farmlands and water for cities. Social pressure by civilians resulted in a public rapid transport network with exclusive bicycle lanes that is expanding in major cities. Sustainable waste management is a source of pride for the country. Apart from carbon capture and storage, forests are also appreciated for the economic and social value of ecosystem services.



Illustration of the scenario. 'Hipster republic' Image credits: Laura Astorga

‘Teresa broke down’ is a world where Costa Rica has broken its social pact, and the state’s solidarity has been lost. Strategic public services such as roads, electricity, public transport, ports, airports, railways and financial services, are controlled by monopolies or oligopolies of foreign capital. Mining and oil exploitation have caused environmental depletion and rural population displaced by unemployment have increased demand for natural resources. The energy matrix has reconverted to fossil fuels due to the lack of water for once large hydroelectric plants. Although all of this happens in a context of extreme social and economic inequality, agile and flexible state structures generate areas of opportunity for innovation and private investment.



Illustration of the scenario. ‘Teresa broke down’ Image credits: Laura Astorga

COSTA RICA’S SCENARIO-GUIDED INDC PROCESS, STEP BY STEP:

- 27 national experts and decision makers in climate change and all sectors involved in reducing emissions (agriculture, transport, forests, electric energy and waste) came together to revise a summary document of current strategies that the Ministry of Environment was taking into account at that time to reduce emissions. The document had been put together for the workshop and was based on conservative quantitative modeling of what could be achieved with existing technology and social / political arrangements. This modelling was carried out by a separate team with support from the World Bank.
- Experts from each sector validated the proposed strategies in their area of expertise, suggested changes and added strategies to reduce emissions that were not yet taken in account.
- Participants created four future scenarios of Costa Rica in 2030 under climate change, both positive as well as negative, based on future drivers of change relevant to reducing emissions in agriculture and livestock, electric energy, transport, waste and forests. The scenarios revealed relevant uncertainties that might influence the possibility of effectiveness of low emission measures.

- Finally, the validated emission reduction measures of all sectors were tested for resilience in the four future scenarios. Recommendations were made on how to improve each strategy under the most common circumstances across all four scenarios.
- The improved emission reduction measures were used as an input for discussion in the following national debates for each specific sector. They were also taken into account at the final stage of the INDC design. 10 of the 23 measures on which the INDC is based were proposed in the scenarios workshop.

MULTIDISCIPLINARY APPROACH

Involved in the scenario exercise were 27 key experts and decision makers in climate change, forests, agriculture, transport, waste management and energy from the following public and private institutions as well as research organizations, including the Climate Change department of the Ministry of Environment, the United Nations Development program (UNDP), World Bank, Latin Clima, Programa de Investigación en Desarrollo Urbano Sostenible (PRODUS), Universidad de Costa Rica (UCR), Universidad Nacional de Costa Rica (UNA), Facultad Latinoamericana de Ciencias Sociales (FLACSO), Estudios, Proyectos y Planificación S.A. (EPYPSA), SCS Global Services, German Corporation for International Cooperation (GIZ), Fundacion Para El Desarrollo De La Cordillera Volcanica Central (FUNDECOR), Chrysin S.A, Costa Rica Limpia, Conservation International (CI), and CO2.cr.

KEY INSIGHTS FROM SCENARIOS

- All scenarios show a strong migration from rural areas as well as from the Pacific and Atlantic coast to the greater metropolitan area.
- Lack of coordination between and varying levels of institutional capacity of state departments can create a context in which the private sector, market mechanisms including illegal activities, take charge and decide how the country will develop without considering natural resources or the social welfare of its people.
- Under these circumstances and the expected changes in climate, the country needs a state with clear regulations that are implemented and monitored
- The lack of or high cost of water resources in Costa Rica due to draught or private ownership is a serious future risk for social and economic welfare, and for renewable energy dependent on hydroelectric plants.
- The current policy of opening the country up to regional and global markets is seen as a threat to sustainable development. It is important to develop a clear vision of desired development to be followed in the light of the national contribution.
- Public – private partnerships emerge as a response to several scenarios as an alternative to ensure economic development in a low emission economy, also in the forest sector.

PROPOSED POSSIBILITIES OF FUTURE COLLABORATION

Several suggestions have been made on behalf of the INDC team to establish further scenario-guided policymaking:

- Food security is an issue of high significance for the region. A collaboration with CCAFS is requested to advise on low emission strategies (LEDS) that ensure sustainable production and higher yields for main subsistence crops.
- There is still significant debate about suitable LEDS in the transport and energy sector. Taking into account that recent and future development in technology may influence the countries capacity to lower emissions and public-private regulations, the development of future scenarios for these specific sectors would be beneficial for the development of robust plans or policies that address the needs and possibilities of all stakeholders involved. Ideally, these back-casting exercises would be combined with quantitative modeling to measure possible impacts of LEDS under several scenarios.

- The training of government officials in the CCAFS scenarios methodology would help establish the institutional capacity to analyze and address continuous changes in these last two sectors, as well as in agriculture and livestock, considering the priority of food security in the region.

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