ESTIMATING THE INVESTMENTS REQUIRED TO ADDRESS CLIMATE CHANGE IN ECUADOR

http://www.undpcc.org/en/ecuador

River waterways might be affected from the impacts of climate change, such as tropical glacier retreat. Photo credit: www.onthegotours.com

→ Ecuador has vast tracts of rainforest; this rich biodiversity provides a wide range of activities and land uses that are likely to be affected by climate change. The government of Ecuador has calculated that it will need US$ 7.55 billion by 2030 to address the impacts of climate change on food security, as well as to reduce greenhouse gas (GHG) emissions from forestry activities and transportation, according to an evaluation of investment and financial flows (I&FF) which was completed in September 2011.

The Ecuadorian government has enacted a State Policy on climate change adaptation and mitigation, and is working on and encouraging efforts to both reduce the country's vulnerability to climate change impacts, and to reduce emissions in production and social sectors. National capacity development and the I&FF assessment have been key tools for national planning and management of climate change.

The I&FF assessment was undertaken as part of the global UNDP project, "*Capacity Development for Policy Makers to Address Climate Change*". Ecuador is one of the 20 countries participating in the project, along with other countries in Africa, Asia and Latin America. The project is funded by the governments of Norway, Switzerland, Finland, UNDP, and the United Nations Foundation.

Selection of key sectors

The national criteria for selecting which key sectors to evaluate were: contribution of sector to GDP; importance for socio-economic and productive contribution to the implementation of the National Plan for Good Living; contribution to the reduction of emissions of GHGs; and contribution to decision-making for implementation of sectoral measures.

For **food security (agriculture)**, the analysis considered actions to reduce vulnerability of farmers against risks and losses caused by climate change. The agricultural sector is one of the most important with respect to national economic development. Between 1980 and 2003, agricultural GDP increased from 10.48-19.43% of total GDP (Rubio, B., 2008).

The **transport** sector is key for the country's economy from the perspective of allowing the mobilisation of goods and services. This represents 7% of GDP, and is prioritised in the National Plan for Good Living. Nationally, the growth of the transport fleet and resulting GHG emissions has been dramatic: over a period of 16 years, GHG emissions in the sector have grown almost 80%.

The **forestry** sector has an economic contribution to GDP of 2.3% (Central Bank, 2007), and provides a range of environmental services (e.g., promoting the protection of biodiversity and carbon sequestration) as well as financial services (e.g., subsistence for communities who depend on the forest for livelihoods).

Institutional arrangements

The Ministry of Environment led interagency coordination for the I&FF assessment, managing the flow and exchange of information. It also participated with the Transport and Public Works, and Agriculture, Livestock and Fisheries in undertaking the work, with inputs from various public and private stakeholders. The financial sector was actively involved in the process, with the participation of key actors from the Andean Development Corporation, the National Finance Corporation, the Ministry of Economic Policy Coordination, and the Ministry of Economy and Finance among others. The socio-economic and environmental assumptions used to define the different scenarios were agreed during national inter-ministerial dialogues.

UNDP and the Instituto Torcuato di Tella, a regional centre of excellence based in Argentina, provided technical assistance to the national I&FF teams.

In Ibero America, the global project outcomes have been reinforced through the UNDP regional initiative, Climate Policy 2012.

ASSESSMENT OF INVESTMENT AND FINANCIAL FLOWS

Objectives of the I&FF assessment

The overall objective of the I&FF assessment is to determine the extent and sources of funds needed to address climate change at the national level, and builds directly on national government strategies, plans and programmes. In essence, the assessment seeks to answer the question: *"From a development perspective, what can my country do to address climate change in selected key sectors, and what level of financial contributions will be needed to achieve these objectives?"*

In this context, the I&FF teams examined the following questions:

- What are the main adaptation / mitigation measures for the selected sectors in the next 25 years?
- Who is investing in the sector / Who are the main stakeholders and sources?
- What changes / increase in I&FF will be needed in the sectors?
- What additional I&FF are needed to address climate change?

For each sector, a baseline and an adaptation or mitigation scenario were developed to determine the flows of investments and finance needed to undertake priority measures from 2011-2030. The values are given in constant 2005 US$. The assessment looks at the changes in investments needed for three different groups: households (families, individual farmers), corporations (private and NGOs), and the government.

The main adaptation and mitigation measures in Ecuador, for the food security, transport, and forestry sectors will require investments of US$ 7.55 billion (in constant 2005 dollars; discount rate 0.1%). Of this, adaptation measures to climate change in the food security sector will require US$ 2.38 billion, while mitigation measures in the transport and forestry will require US$ 2.55 billion and US$ 2.62 billion respectively.

For the food security sector (adaptation to climate change impacts)

During the period 2011-2030, the sector will require an estimated US$ 2.38 billion of investments. The main measures selected were:

- Manage and conserve renewable natural resources (US$ 101.4 million);
- Improved agricultural productivity of small farmers (US$ 1.024 billion);
- Design, build and equip early warning systems (US$ 33.8 million);
- Strengthen the territoriality of food security (US$ 1.22 billion).

41% of I&FF must be invested by the government, 31% from international sources, and 28% from small and medium producers. The process of adaptation to climate change requires that 60% of the incremental investments should occur by 2015.

For the transport sector (mitigation of GHG emissions)

During the period 2010-2030, the sector will require an estimated US$ 2.55 billion of investments. The main measures selected were:

- sustainable urban mobility (US$ 1.36 billion);
- improved fuel quality (US$ 52.7 million);
- use of rail as an alternative for freight (US$ 1.14 billion).

"The project was useful for the Ministry of Environment, as the lead agency for climate change management in Ecuador. The results have allowed a focused reflection in terms of the investments and financial flows that will be needed to implement priority adaptation and mitigation measures in the forestry, transport and food security sectors. It is the first exercise in which Ecuador has identified the amount of resources that are required to combat climate change by size and type of financing. The data becomes a valuable tool both for decision-making and in the search for financial resources from sources of international cooperation to implement the measures identified in the framework of this initiative" MEM Carola Borja, Assistant Secretary, Climate Change Secretariat, Ministry of Environment.

The amount of investments required is US$ 2.1 billion (81% of the total) while the financial flows total US$ 207.8 million. The government would be required to make 94.5% of the costs required in the sector.

For the forestry sector (mitigation of GHG emissions)

During the period 2011-2030, the sector will require an estimated US$ 2.62 billion of investments. The main measures selected were:

- Carbon sequestration through afforestation and reforestation (US$ 1.93 billion);
- Reduced deforestation of native forests (US$ 298.2 million);
- Sustainable forest management and reduced use of native forest wood (US$ 388.9 million).

Investment flows amount to US$ 1.46 billion (55 % of the total amount required), of which the government will have to provide the majority of funds (nearly 69 %).

EVALUATION OF POLICY IMPLICATIONS

For the food security sector (adaptation to climate change impacts)

- Creation of a "National Adaptation Fund" for small- and medium-sized enterprises.
- Creation of opportunities to incentivise reinvestment by small- and medium-sized enterprises, and to encourage international funding in the sector.
- Coordination of policies on price setting, strategic reserves, and production planning.
- Analyse policies on water and climate change and the activities of the Autonomous Decentralized Governments to promote Integrated Watershed Management.
- Strengthen planning with producers / consumers; incorporate climate change mainstreaming considerations in public administration.

SUMMARY TABLES OF INCREMENTAL INVESTMENT COSTS

Table 1. Investment flows and cumulative incremental funding for all investments in each sector, by type of institution and source of investment financing. In millions of constant 2005 US$ with a discount rate of 0.1%. Transport sector: 2010-2030; food security and forestry sectors: 2011-2030.

Category of investment entity	Sources of I&FF		Transport				Forestry				Food security			
			ΔIF	ΔFF	ΔO&M	ΔTotal	ΔIF	ΔFF	ΔO&M	ΔTotal	ΔIF	ΔFF	ΔO&M	ΔTotal
Households	Domestic	Households in general	0.12	0.01	0.01	0.14	-	-	-	-	-	-	-	-
		Small and médium-size producers	-	-	-	-	-	-	-	-	0.00	0.00	0.00	0.01
		Production of small and médium-size producers	-	-	-	-	-	-	-	-	0.66	-	-	0.66
Corporations	Domestic	Domestic Equity	2.02	0.20	0.26	2.48	1.00	0.39	0.41	1.80	0.45	0.45	0.08	0.98
		National funds	-	-	-	-	-	-	-	-	-	-	-	-
	Foreign	Foreign direct investment (FDI)	-	-	-	-	-	-	-	-	-	-	-	-
		Bilateral aid (ODA)	-	-	-	-	-	-	-	-	0.00	0.00	0.00	0.00
		Multilateral aid (ODA)	-0.06	-0.01	-0.00	-0.08	-	-	-	-	0.45	0.19	0.09	0.73
Government	Domestic	Domestic funds	-	-	-	-	-	-	-	-	-	-	-	-
		National funds	-	-	-	-	0.46	0.17	0.19	0.82	0.00	-	0.00	0.00
	Foreign	Foreign direct investment (FDI)	-0.00	-0.00	-0.00	-0.00	-	-	-	-	-	-	-	-
		Foreign aid (ODA)	-	-	-	-	-	-	-	-	-	-	-	-
Total			2.08	0.21	0.26	2.55	1.46	0.56	0.60	2.62	1.56	0.64	0.17	2.38

FI = Investment Flows, FF = Financial Flows, O&M = Operation and Maintenance costs
ΔI&FF = Change in Investment and Financial Flows; ΔO&M = Change in Operation and Maintenance costs
Negative values mean net savings.
Figures might not add up due to rounding errors
Source: National I&FF assessments

For the transport sector

- Form a working group to promote cross-cutting activities to analyze the relationship of climate change mitigation with transport and public mobility.
- Strengthen actions on the implementation of an integrated transport system alternative at the subnational level.
- Promote sustainable mobility strategies and rail traffic; prioritised for investment.
- Promote investments to improve the quality of fuels, installation of vehicle fuel filters, and parameters of vehicle technical inspection.
- Include issues associated with sustainable urban mobility as part of strategies for long-term urban growth.

For the forestry sector

- Analyse new instruments for regulating the forestry sector.
- Provide measures to support action on mitigation, and promote other new incentives to increase conservation of native forests.
- Foster the growth and maintenance of new forests for conservation and sustainable management practices.

Table 2. Investment flows and annual incremental funding streams for all investments in each sector. In millions of constant 2005 US$ with a discount rate of 0.1%. Transport sector: 2010-2030; food security and forestry sectors 2011-2030.

Year	Mitigation								Adaptation			
	Transport				Forestry				Food Security			
	ΔIF	ΔFF	ΔO&M	ΔTotal	ΔIF	ΔFF	ΔO&M	ΔTotal	ΔIF	ΔFF	ΔO&M	ΔTotal
2011	0.11	0.01	-0.01	0.11	0.39	0.00	0.01	0.39	0.27	0.13	0.02	0.42
2012	0.09	0.01	-0.01	0.10	0.32	0.03	0.01	0.37	0.27	0.13	0.02	0.43
2013	0.11	0.01	-0.00	0.12	0.24	0.00	0.02	0.26	0.24	0.11	0.02	0.37
2014	0.14	0.01	0.01	0.17	0.06	0.00	0.03	0.09	0.07	0.03	0.01	0.11
2015	0.11	0.01	0.01	0.14	0.06	0.00	0.04	0.10	0.04	0.02	0.01	0.07
2016	0.11	0.01	0.01	0.13	0.02	0.02	0.04	0.07	0.04	0.02	0.01	0.07
2017	0.06	0.01	0.01	0.07	0.03	0.00	0.04	0.07	0.05	0.02	0.01	0.07
2018	0.07	0.01	0.01	0.09	0.03	0.00	0.04	0.06	0.04	0.02	0.01	0.07
2019	0.07	0.01	0.01	0.08	0.03	0.00	0.04	0.06	0.04	0.02	0.01	0.07
2020	0.27	0.03	0.03	0.32	0.03	0.02	0.04	0.09	0.05	0.02	0.01	0.07
2021	0.24	0.02	0.02	0.28	0.03	0.00	0.04	0.06	0.05	0.01	0.01	0.07
2022	0.22	0.02	0.02	0.27	0.03	0.00	0.03	0.06	0.05	0.01	0.01	0.06
2023	0.21	0.02	0.02	0.26	0.03	0.00	0.03	0.06	0.05	0.01	0.01	0.06
2024	0.20	0.02	0.02	0.25	0.03	0.02	0.03	0.08	0.04	0.01	0.01	0.06
2025	0.03	0.00	0.02	0.05	0.03	0.00	0.03	0.06	0.04	0.01	0.01	0.06
2026	0.00	0.00	0.02	0.02	0.03	0.18	0.03	0.24	0.05	0.01	0.01	0.06
2027	0.00	0.00	0.02	0.02	0.03	0.14	0.03	0.20	0.05	0.01	0.01	0.06
2028	0.00	0.00	0.02	0.02	0.03	0.11	0.03	0.17	0.05	0.01	0.01	0.06
2029	0.00	0.00	0.02	0.02	0.03	0.02	0.03	0.07	0.05	0.01	0.01	0.06
2030	0.00	0.00	0.02	0.02	0.03	0.02	0.03	0.07	0.05	0.01	0.01	0.07
Total	2.06	0.21	0.28	2.55	1.46	0.56	0.60	2.62	1.56	0.64	0.17	2.38

FI = Investment Flows, FF = Financial Flows, O&M = Operation and Maintenance costs
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Negative values mean net savings.
Figures might not add up due to rounding errors
Source: National I&FF assessments

Knowledge platform *The project website www.undpcc.org contains information on the activities of Ecuador, UNDP's I&FF methodology, and other resources. In Ibero America, the global project outcomes have been reinforced through the UNDP regional initiative, Climate Policy 2012, which has provided additional technical and financial support to the region to amplify the impact of policy and investment discussions. September 2011*

More information on activities in Ecuador

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