



INVESTMENT NEEDS TO ADDRESS CLIMATE CHANGE IN PARAGUAY



The impacts of climate change should be taken into account in farming practices in Paraguay to ensure both return on investment as well as the conservation of natural resources. Photo credit: www.misionesonline.net

<http://www.undpcc.org/en/paraguay>

Selection of key sectors

The government of Paraguay identified three key sectors for the I&FF assessment – forestry, agriculture, and health – because environmental and human capital are key factors for Paraguay’s Gross Domestic Product (GDP).

The **forestry** sector in Paraguay plays an important economic role as well as an environmental one. Forestry contributes 2.7% of total GDP while forest industries contribute about 2.2% (FAO, 2004). Native forests still covered about 19 million hectares in 2004, but it is estimated that around 140,000 to 160,000 hectares are felled annually in the Eastern region of the country and around 200 000 hectares in the Western region.

Agriculture is the key driver of GDP growth in Paraguay. Nearly 42% of Paraguay’s six million inhabitants reside in rural areas; of these, 63% are engaged in primary production activities (Department of Statistics and Census Surveys, 2007). The subsectors agreed with the Ministry of Agriculture for analysis were family farming, agribusiness and cattle. This decision was based on an analysis of national priorities and public policies of Paraguay in the last decade.

The selection of **health** took into account the recommendations from successive public consultations in the framework of the Second National Communication of Paraguay. Vector-borne diseases, such as malaria and dengue, are predicted to rise as a result of increased temperatures and rainfall caused by climate change.

Institutional arrangements

The Government of Paraguay formed a Project Coordination Committee, which involved the Ministry of Environment (SEAM), the Ministry of Finance, the Ministry of Foreign Affairs and the Technical Secretariat of Planning. The Project Coordinating Committee participated in the selection of national experts for the I&FF assessment and was responsible for guiding and

→ Climate change is already causing an increase in temperatures in Paraguay, affecting agriculture and public health. At the same time, the country has large areas of forest, which offer significant carbon sinks. In Paraguay, the main adaptation measures for agriculture and health, as well as mitigation measures for forestry require investments amounting to US\$ 393.36 million. Of this, the agriculture sector will require US\$ 160.93 million, the health sector US\$ 147.06 million and forestry US\$ 85.37 million.

The project was considered a useful experience for the government from both political and technical perspectives, as the process of undertaking the assessment of investment and financial flows (I&FF) enhanced technical capacities and emerged as a key policy tool for national planning on the management of climate change at different levels.

The assessment of investment and financial flows (I&FF) is a core component of the UNDP global project, ‘Capacity Development for Policy Makers to Address Climate Change’. Paraguay is one of the 20 countries participating in the project, which is funded by the governments of Norway, Switzerland, and Finland, UNDP and the United Nations Foundation.

validating the work and approving the results. The Committee also was consulted on policy implications emanating from the I&FF results and facilitated access to the information required for the I&FF assessment.

The economic, environmental and social assumptions that underly the scenarios were discussed and agreed through a national inter-ministerial dialogue. UNDP and the Instituto Torcuato di Tella (ITDT), the regional centre of excellence supporting countries in Latin America, provided technical assistance to the national I&FF team.

The project's outcomes have been reinforced through the UNDP regional initiative, Climate Policy 2012, funded by the government of Spain and UNDP, which provides additional technical and financial support to 19 countries in Ibero-America, including Paraguay, to amplify the impacts of the I&FF process.

ASSESSMENT OF INVESTMENT AND FINANCIAL FLOWS

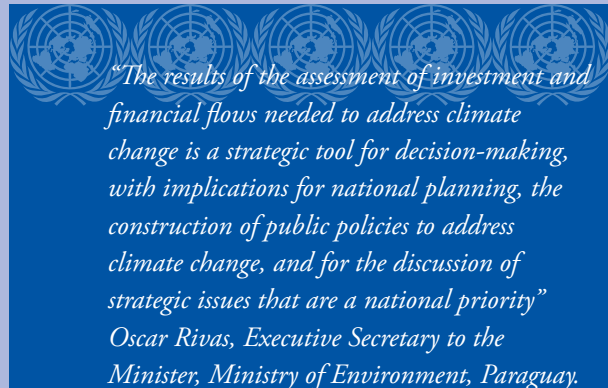
Objectives of the Investment and Financial Flows Assessment

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 team 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?

To determine the investment flows (IF) and financial flows (FF) needed for adaptation / mitigation measures in the key sectors from 2010 to 2030, a baseline scenario and an adaptation / mitigation scenario was created for each sector. Values are given in constant 2005 US\$ (1 US\$ = 5033 PYG). The assessment looks at the changes in I&FF needed for three different groups: households, corporations and government.



For the forestry sector (mitigation of greenhouse gas emissions)

During 2010-30, an estimated US\$ of 85.37 million will be needed in the forestry sector to address climate change in the following ways:

- Capacity building: Strengthening capacities of public, private and academic institutions related to forestry, providing incentives for applied forest research and promotion of technology transfer (US\$ 13.88 million);
- Sustainable forest management: Recovering areas of the country that are degraded due to the high rate of deforestation with effective implementation of a national REDD+ programme (US\$ 20.39 million);
- Forest plantations for small and large producers: Combining forest species with agricultural crops and pasture for livestock that could generate significant economic, social and environmental benefits (US\$ 34.79 million);
- Land use planning and zoning: Promoting the zoning of land suitable for forestry and promoting competitiveness of forest industry and services (US\$ 16.31 million).

Investment flows needed are estimated at US\$ 48.03 million (56% of the costs), while financial flows amount to US\$ 32.26 million (37%) and the operation and maintenance (O&M) costs to US\$ 6.05 million (7%). The government will have to provide 80% of the funds (US\$ 67.87 million), with corporations funding the remainder (US\$ 17.50 million).

For the agriculture sector (adaptation to the impacts of climate change)

During 2010-2030, an estimated US\$ 160.93 million will be needed to adapt to climate change impacts in the agriculture sector. The main measures are:

- Family farming: Improving access to agricultural

services, covering non-governmental funding sources, increasing technical assistance and related services to institutions, as well as research and planning (US\$ 160.26 million);

- Agri-business: From the viewpoint of the Agricultural Strategic Framework, the private sector is highly profitable, mainly due to soy production, so it was assigned a 0% increase in allocation of public funds (US\$ 0.00 million);
- Livestock: As the government will provide water supplies for livestock in the Western region of the country, an increase in livestock was estimated at 25% (US\$ 0.67 million).

More than 50% of the required amount is financing flows (US\$ 81.30 million), while investment flows amount to 40% of the total (US\$ 63.67 million) and O&M totals 10% (US\$ 15.95 million). The principal investment entity is external government sources (75% of required amount).

For the health sector (adaptation to the impacts of climate change)

To implement the selected measures, an estimated US\$ 147.06 million is needed. The adaptation measures were identified according to their relevance in helping to achieve the Millennium Development Goals (MDGs) in spite of climate change, namely: i) Reforming surveillance systems and health infrastructure, ii) creating an effective response capacity for emergencies, and iii) strengthening the National Health System. The following major diseases were analysed:

- Dengue (US\$ 23.70 million);
- Malaria (US\$ 4.24 million);
- Acute respiratory infections (US\$ 61.51 million);
- Acute diarrheal diseases (US\$ 30.79 million);
- Other diseases (US\$ 26.82 million).

The major share of costs are investment flows at US\$ 77.08 million (64%), while financial flows total US\$ 33.31 million (28%) and O&M amounts to US\$ 9.60 million (8%). All funds will be provided by the government.

EVALUATION OF POLICY IMPLICATIONS FROM THE I&FF ASSESSMENT

For the forestry sector (mitigation of greenhouse gas emissions)

The assessment shows that the investment flows needed for the forestry sector to address climate change are minimal compared with their benefits. The results suggest concentrating efforts on the following aspects:

- Create a national system to promote and coordinate forestry activities under the Ministry of Foreign Affairs to attract international investment;
- Provide legal security for investments being undertaken in the forestry sector;
- Establish tax incentives that promote investment in the forestry sector and establish a control mechanism that ensures proper implementation of sectoral policies;
- Ensure that Paraguay becomes a 'best practice example' for mitigation activities in the forestry sector, with the support from international agencies;
- Establish an Early Warning Centre for climate conditions and implement the National Forest Information System, with active participation of the private sector.

SUMMARY TABLES OF INCREMENTAL INVESTMENT COSTS

Table 1: Cumulative discounted I&FF and O&M for all investments in each sector, by investment entity and funding source. In millions of constant 2005 US\$, with a discount rate of 3%. Period 2010-2030.

Investment entity	Sources of funds	Forestry				Agriculture				Health			
		ΔIF	ΔFF	ΔO&M	ΔTotal	ΔIF	ΔFF	ΔO&M	ΔTotal	ΔIF	ΔFF	ΔO&M	ΔTotal
Households	Domestic	-	-	-	-	-	-	-	-	-	-	-	-
Corporations	Internal	15.32	-	2.17	17.50	-	-	-	-	-	-	-	-
Government	Internal	31.11	31.26	3.65	66.01	15.92	20.33	3.99	40.23	103.39	33.20	9.83	146.41
	External	1.60	-	0.25	1.86	47.76	60.98	11.96	120.70	0.52	0.13	-	0.65
Total		48.03	31.26	6.07	85.37	63.67	81.30	15.95	160.93	103.91	33.33	9.83	147.06

IF = Investment Flow, FF = Financial Flow, O&M = Operation and Maintenance costs
 ΔI&FF = incremental changes of Investment and Financial Flows, ΔO&M = incremental changes of Operation and Maintenance costs
 Source: National I&FF assessment

For the agriculture sector (adaptation to the impacts of climate change)

- Ensure the application of environmental standards, as well as the development and implementation of a clear regulatory framework of land;
- Establish a national system for the identification and implementation of adaptation measures, which will be necessary to allocate appropriate budgets for targeted activities;
- Establish a technical career track within the civil service based on merits; design and implement process-based inter-agency activities; and establish a multi-year budget based on agreed priorities;
- Create incentives to implement existing processes, and develop and implement further legal instruments to strengthen institutions to apply adaptation measures to climate change. Further training of policy leaders is also required.

For the health sector (adaptation to the impacts of climate change)

The following policy instruments are recommended:

- Strengthen the National Health System to provide universal access to basic health services, particularly with a focus on diseases that are anticipated to increase under climate change;
- Include public health management on the political agenda and conduct studies on the effects of climate change on health, especially among vulnerable groups;
- Establish an effective system of disease surveillance in general, particularly monitoring climate change related and vector-borne diseases including dengue, yellow fever, malaria, etc;
- Disseminate information to stakeholders on the relationship between diseases and climate variability and how it could impact people's lives;
- The government should enforce plans to avoid summer blackouts, as well as the risks of diseases caused by floods and other diseases related to poverty and a lack of basic services.

Table 2: Annual incremental I&FF and O&M for all investments in each sector.
In millions of constant 2005 US\$ with a discount rate of 3%. Period 2010-2030.

Year	Forestry				Agriculture				Health			
	Δ IF	Δ FF	Δ O&M	Δ Total	Δ IF	Δ FF	Δ O&M	Δ Total	Δ IF	Δ FF	Δ O&M	Δ Total
2010	2.05	1.15	0.28	3.48	2.41	3.08	0.60	6.10	0.51	0.83	0.10	1.43
2011	2.09	1.18	0.28	3.55	2.47	3.16	0.62	6.25	3.01	0.83	0.15	3.98
2012	2.13	1.21	0.29	3.63	2.54	3.24	0.64	6.41	4.95	0.83	0.25	6.02
2013	2.17	1.24	0.29	3.70	2.59	3.32	0.65	6.57	2.75	0.83	0.25	3.83
2014	2.21	1.27	0.30	3.78	2.66	3.40	0.67	6.72	4.00	0.83	0.25	5.08
2015	2.00	1.30	0.25	3.56	2.72	3.48	0.68	6.88	5.35	1.18	0.38	6.90
2016	2.05	1.33	0.26	3.64	2.78	3.56	0.70	7.04	3.00	1.18	0.38	4.55
2017	2.09	1.37	0.26	3.72	2.85	3.63	0.71	7.19	1.00	1.18	0.38	2.55
2018	2.14	1.40	0.27	3.81	2.91	3.71	0.73	7.35	1.40	1.18	0.38	2.95
2019	2.19	1.44	0.27	3.90	2.97	3.79	0.74	7.51	4.30	1.18	0.38	5.85
2020	2.23	1.47	0.28	3.99	3.03	3.87	0.76	7.66	7.15	1.73	0.50	9.38
2021	2.28	1.51	0.29	4.08	3.09	3.95	0.77	7.82	9.00	1.73	0.53	11.25
2022	2.33	1.55	0.29	4.17	3.16	4.03	0.79	7.98	3.00	1.73	0.53	5.25
2023	2.39	1.59	0.30	4.27	3.22	4.11	0.81	8.13	1.50	1.73	0.53	3.75
2024	2.44	1.62	0.30	4.37	3.28	4.19	0.82	8.29	6.25	1.73	0.53	8.50
2025	2.39	1.67	0.29	4.35	3.34	4.27	0.84	8.45	8.25	2.45	0.73	11.43
2026	2.45	1.71	0.30	4.46	3.40	4.35	0.85	8.60	8.50	2.45	0.73	11.68
2027	2.51	1.75	0.30	4.56	3.47	4.43	0.87	8.76	4.00	2.45	0.73	7.18
2028	2.57	1.79	0.31	4.67	3.53	4.50	0.88	8.92	7.50	2.45	0.73	10.68
2029	2.63	1.84	0.32	4.78	3.59	4.58	0.90	9.07	9.00	2.45	0.73	12.18
2030	2.69	1.88	0.32	4.90	3.65	4.66	0.91	9.23	9.50	2.45	0.73	12.68
Total	48.03	31.26	6.07	85.37	63.67	81.30	15.95	160.93	103.90	33.33	9.83	147.06



Knowledge platform
The project website www.undpcc.org contains information on the activities of Paraguay, the I&FF methodology and other resources.

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IF = Investment Flow, FF = Financial Flow, O&M = Operation and Maintenance costs
 Δ I&FF = incremental changes of Investment and Financial Flows, Δ O&M = incremental changes of Operation and Maintenance costs
Source: National I&FF assessment

More information on activities in Paraguay

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