



ASSESSMENT OF THE INVESTMENTS NEEDED TO ADDRESS CLIMATE CHANGE ADAPTATION IN PERU



Anchovies are not only an essential part of fish exports from Peru; the fish also play a critical role in the ecosystem food chain. Photo: UNDP

→ Considering the high costs implied by the impacts of climate change in developing countries, it has become essential to estimate the magnitude of funds needed to implement priority climate change measures in the short and longer term. According to a national assessment of investments and financial flows (I&FF) completed in August 2011 in Peru, more than US\$ 2.44 billion is needed through to 2030 for Peru to implement priority adaptation actions in the agriculture, water and fisheries sectors.

The I&FF assessment was undertaken as part of the global UNDP project, “*Capacity Development for Policy Makers to Address Climate Change*”. Peru is one of the 20 countries participating in the project worldwide. The project is funded by the governments of Norway, Switzerland, Finland, UNDP, and the United Nations Foundation.

The I&FF assessment for adaptation to climate change is a component of the project being done in an important context for the country. The economic dynamism of the country implies an increase in pressure over land and resources. In some cases, these investment processes have been accompanied by social and environmental conflicts, which can be exacerbated by climate change effects due to the high country’s vulnerability to climate change.

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

At the same time, the I&FF assessment has been conducted in parallel to international negotiations of the UN Framework Convention on Climate Change, where Parties are agreeing, among other things, commitments on long-term cooperation for adaptation to climate change and a new financial architecture.

Selection of key sectors

The government of Peru identified three key sectors for the I&FF assessment – water, agriculture, and fisheries – because of their high contribution to economic development and their vulnerability to the impacts of climate change.

The **agriculture** sector is key to national socio-economic development, accounting for 4.7% of national GDP. It employs 23.3% of the economically active population overall, of which 65% lives in rural areas. Climate change could cause a 10-20% drop in production over the next century.

The **water** sector has a skewed distribution: the basin of the Pacific slope, which provides only 1.8% of water resources to the country, is home to most of the population (65%). The Atlantic slope generates 98% of water resources, but holds only 14% of the population. Agriculture is the highest consumer of water resources, followed by the energy sector.

The **fishery** sector is one of the most important industries in Peru, which has one of the highest catch rates in the world. It accounted for 0.5% of national GDP in 2008.

Institutional arrangements

The Ministry of Environment, which was the body responsible for coordinating the project, has validated the final results together with an Inter-sectoral Committee. The Inter-sectoral Committee, which included representatives of the Ministries of Environment, Economy and Finance, and Agriculture, the Vice Minister of Fisheries, and the National Water Authority, also supported the data collection and

validation of assumptions. The socio-economic and environmental assumptions used to define the different scenarios were also discussed during national inter-ministerial dialogues.

The Committee functioned as a consultative platform where different experts and representatives of sectors involved in the assessment could contribute to the collection of information, discussion of assumptions, and analysis of progress. The assessment was carried out by a national consultancy, Libelula: Maria Elena Gutierrez (project chief), Flavio Ausejo (water), Carlos Paredes (fisheries), Jose Remigio and Miguel Davila (agriculture), and Diana Morales, Maria Paz Cigaran, Jose Wong, and Oscar Ubillus.

The global project outcomes have been further reinforced through the Spanish-funded UNDP regional initiative, Climate Policy 2012, which is providing additional technical and financial support to the Ibero-American region to amplify the impact of the policy and investment discussions.

The underlying economic, environmental and social assumptions have been defined through inter-ministerial dialogues. Based on this national leadership, UNDP and the Instituto Torcuato di Tella, a regional centre of excellence based in Argentina, provided technical assistance to the national I&FF teams.

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 team examined the 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?

The I&FF assessment covered the time period 2009-2030, using a baseline scenario and a reference (adaptation) scenario for each sector. Values are given in constant 2005 US\$ (US\$ 1 = 2.7 PEN). The assessment looks at the changes in investments needed for three different groups: households (families, individual farmers), corporations (private and NGOs), and the government.

Agriculture sector (adaptation to climate change impacts)

The assessment was oriented toward the regions of Junín (a principal potato growing region in Peru and the leading supplier of the crop to Lima) and San Martín (which has been expanding agriculture, leading to the production of rice). It was assessed that US\$ 324.2 million will be needed in San Martín and US\$ 806.3 million in Junín to undertake the following measures:

- Infrastructure and equipment for agricultural production and irrigation (San Martín: US\$ -274.0 million, which means a net saving; Junín: US\$ -28.4 million, which means a net saving);
- Inputs for agricultural production (San Martín: US\$ 487.8 million, Junín: US\$ 690.9 million);
- Training, outreach, and awareness (San Martín: US\$ 21.2 million, Junín: US\$ 36.1 million);
- Agricultural research (San Martín: US\$ 17.8 million, Junín: US\$ 22.2 million);
- Ecosystem management (San Martín: US\$ 65.8 million, Junín: US\$ 75.4 million); and
- Institutional capacity building in public administration (San Martín: US\$ 5.5 million, Junín: US\$ 10.0 million).

Water sector (adaptation to climate change impacts)

The assessment was restricted to subsectors of drinking water and sanitation in urban regions on the Pacific coastline. It is estimated that US\$ 953 million will be required to undertake the following measures:

- Improved infrastructure for water collection, treatment, storage and coverage (US\$ 71.7 million);
- Improved infrastructure for sewage treatment and disposal (US\$ 107.6 million);
- Higher efficiency in the water and sanitation service (US\$ 65.4 million);
- Health education (US\$ 32.0 million);
- Integrated management of water resources (ecosystem-based approach) (US\$ 638.1 million); and
- Institutional capacity building in public administration (US\$ 38.2 million).

Fisheries sector (adaptation to climate change impacts)

The assessment was conducted for the sub-sectors of fishing for indirect human consumption (anchovy) and aquaculture (shellfish and trout). The former sub-sector will require an additional investment of US\$ 279.7 million to implement identified measures, while the latter will require an additional US\$ 173.5 million:

- Infrastructure, machinery and equipment for production and extraction (indirect human consumption: US\$ 109.4 million; aquaculture: US\$ 92.5 million);
- Training, outreach and awareness (indirect human consumption: US\$ 2.2 million; aquaculture: US\$ 3.7 million);

- Research (indirect human consumption: US\$ 80.6 million; aquaculture: US\$ 29.3 million);
- Conservation and environmental management (indirect human consumption: US\$ 72.9 million; aquaculture: US\$ 38.6 million); and
- Institutional capacity building in public administration (indirect human consumption: US\$ 14.6 million; aquaculture: US\$ 9.5 million).

It is worth noting that the total investment gap of the three sectors is not the same as the sum of the different programmes of adaptation described. The inconsistency is because the adaptation scenario was defined using different assumptions from the baseline scenario for the agriculture and fisheries sectors. For example, the baseline scenario for the agriculture sector assumes a growth rate of the cultivated area in both regions by 2030 (4.3% in San Martin and 1.15% in Junín). Under the adaptation scenario this growth rate was considered too excessive, as it means converting forested areas into farmland, so for the adaptation scenario the growth rate was modified (3% in San Martin and 0.46% in Junín), which changed the total projection of the adaptation costs. For this reason, both scenarios are different, not only in terms of adaptation, but also the underlying assumptions, which means that the gap between them is not only defined by the proposed measures.

EVALUATION OF POLICY IMPLICATIONS

Agriculture sector (adaptation to climate change impacts)

- Farmers are responsible for the biggest investments for the improvement of crop yields and would need support of the private sector; the promotion of public-private partnerships is recommended to generate added value and strengthen the link to markets.
- For state investments, it is recommended to improve efficiencies in budget execution and to sensitise the authorities within the same states on the urgent need to reallocate funding within state and national budgets, using a participatory approach that includes climate change considerations in investment prioritisation systems – particularly in the formulation of participatory budgeting at regional and local governments level and the national system of public investment.

Water sector (adaptation to climate change impacts)

- The public sector, which will be the major source of funding, should significantly increase its annual budget for the next 20 years, based on the existing sectoral policy and tariff system. In particular, it is recommended to allocate more budgetary resources to ensure the extension

SYNTHESIS TABLES OF INCREMENTAL 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 4.3%. Agriculture sector: 2011-2030; Water and fisheries sectors: 2012-2030.

Investment category	Sources of I&FF		Fisheries			Water			Agriculture		
			ΔIF	ΔFF	ΔO&M	ΔIF	ΔFF	ΔO&M	ΔIF	ΔFF	ΔO&M
Households	National	Equity and debt	-	-	-	-	-	-	-	-	-
	Total Household Funds		-	-	-	-	-	-	-	-	-
Corporations	Domestic	Domestic equity	182.25	26.83	21.45	-	-	-	46.71	-8.99	-454.58
		Domestic borrowing	97.14	-	-	-	-	-	186.85	-	1.058.79
		Total Domestic Sources	279.39	26.83	21.45	-	-	-	233.56	-8.99	604.21
	Foreign	Foreign direct investment	-	-	-	266.96	29.66	53.39	-	-	-
		Foreign borrowing	-	-	-	-	1.20	-	-	-	-
		Foreign aid	-	-	-	-	-	-	31.93	27.37	31.29
		Total Foreign Sources	-	-	-	266.96	30.87	53.39	31.93	27.37	31.29
Total Corporation Funds		279.39	26.83	21.45	266.96	30.87	53.39	265.48	18.38	635.50	
Government	Domestic	Domestic funds	11.01	69.53	29.67	279.96	89.88	24.31	49.54	62.28	76.88
		Foreign borrowing	-	0.73	-	75.38	66.22	31.37	-	-	-
	Foreign	Bilateral foreign aid	3.03	11.56	-	-	34.66	-	2.98	12.14	7.12
		Total Foreign Sources	3.03	12.29	-	75.38	100.88	31.37	2.98	12.14	7.12
	Total Government Funds		14.04	81.81	29.67	355.34	190.76	55.68	52.52	74.43	83.99
Total			293.43	108.64	51.12	622.23	221.63	109.07	318.01	92.81	719.49

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 a net savings.
 Source: National I&FF assessments

of coverage, and reformulate the tariff to include the implementation of cross-subsidies.

- To encourage private investment, it is recommended to strongly promote concessions with the support of ProInversión (the government agency responsible for promoting business opportunities with high growth and profitability expectations), encourage and facilitate public-private partnerships, and maintain a secure and flexible legal framework.

Fisheries sector (adaptation to climate change impacts)

For **indirect human consumption**:

- Fishing companies, which will be required to make the

largest investments, will need to be encouraged to invest in multiple activities over the next 20 years.

- The state would have to consent to a significant increase in its annual budget. It could increase the “fishing rights” paid by companies and owners fishing for the extraction of anchovy.

For **aquaculture**:

- Investments are primarily required by companies that are active in areas adjacent to the coast. The identified measures will only succeed to the extent that legislation is passed requiring companies to comply with new standards or regulations in this field.
- Funding of research, training, awareness, and to improve monitoring and supervision work, will require a significant increase over recent state budget allocations.

Table 2. Investment flows and annual incremental funding streams for all investments in each sector, in millions of constant 2005 US\$. Agriculture sector: 2011-2030; Water and fisheries sectors: 2012-2030

Year	Fisheries			Water			Agriculture		
	ΔIF	ΔFF	ΔO&M	ΔIF	ΔFF	ΔO&M	ΔIF	ΔFF	ΔO&M
2011	-	-	-29.04	-	-	-	49.44	19.63	34.02
2012	45.32	10.41	-25.42	52.87	21.21	9.27	16.70	11.22	48.50
2013	29.20	11.01	-24.92	52.87	19.17	9.27	18.86	11.08	56.88
2014	29.20	11.01	-24.45	52.87	19.17	9.27	18.65	9.42	46.08
2015	3.80	9.89	-23.95	52.87	19.17	9.27	20.86	9.44	53.74
2016	78.44	9.26	-23.40	52.87	19.26	9.27	22.72	7.94	58.57
2017	53.56	8.64	-17.81	52.87	18.88	9.27	16.65	4.97	63.79
2018	103.32	8.64	-12.13	52.87	18.88	9.27	19.06	4.90	68.92
2019	28.68	8.64	23.51	52.87	18.85	9.27	21.06	4.78	74.68
2020	3.80	8.64	29.44	52.87	18.89	9.27	23.97	4.90	79.69
2021	3.80	8.64	30.06	52.87	18.07	9.27	25.01	4.97	73.15
2022	3.80	8.64	30.71	52.87	18.07	9.27	24.57	4.49	70.52
2023	3.80	8.64	31.39	52.87	18.05	9.27	25.54	4.42	67.33
2024	3.80	8.64	32.11	52.87	18.13	9.27	26.51	4.34	63.61
2025	3.80	8.64	32.87	52.87	18.23	9.27	27.50	4.33	59.46
2026	3.80	8.64	33.67	52.87	18.13	9.27	28.45	4.16	54.49
2027	0.68	8.64	33.90	52.87	18.20	9.27	29.43	4.07	49.04
2028	0.68	8.64	34.19	52.87	18.23	9.27	30.40	3.96	42.94
2029	0.68	8.64	34.54	52.87	18.23	9.27	31.37	3.85	36.21
2030	0.68	8.64	34.97	52.87	18.33	9.27	32.36	3.82	28.75

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 Negative values mean a net savings.
 Source: National I&FF assessments

Spanish knowledge platform The project website www.undpcc.org contains information on activities in Peru, I&FF methodology, as well as numerous other resources.
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More information on activities in Peru

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