



Integrating adaptation and mitigation in climate change and land-use policies in Peru

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1 Introduction

Two general strategies to address climate change are usually adopted in negotiations, policies and practice: mitigation – reducing emissions or enhancing the sequestration of greenhouse gases (GHGs) –and adaptation – responding to the impacts of climate change. These strategies have been discussed and treated separately as they have different aims and operate on different spatial and temporal scales; mitigation benefits global climatic conditions in the long-term, while adaptation provides both short- and long-term benefits at the local level (Swart and Raes 2007).

Both adaptation and mitigation are important for Peru. The 69 million ha forest cover in the country provides opportunities for mitigation through programs such as Reduced Emissions from Deforestation and Forest Degradation (REDD+), especially as land use and land-use change are responsible for almost half of Peru's greenhouse gas (GHG) emissions (Menton et al. 2014). Peru is also vulnerable to the impacts of climate change and adaptation measures are urgently required (Chazarin et al. 2014).

There are interactions between adaptation and mitigation and between the two climate change strategies and other sectoral strategies and priorities (Verchot et al. 2007; Locatelli et al. 2011). Adaptation actions can have positive or negative effects on mitigation, and *vice versa*. The interactions between adaptation and mitigation are particularly evident in agriculture, forestry and other ecosystem management- and land-use-based activities. For example, adaptation projects can affect ecosystems and their ability to sequester and store carbon, while mitigation projects can enhance adaptive capacity or increase the vulnerability of people (Locatelli et al. 2011).

The interactions between adaptation and mitigation must be considered when designing policies and strategies. The lack of consideration of adaptation in initiatives targeting GHG emissions could not only lead to maladaptation but could also jeopardize the permanence of emission reductions (e.g. in the case of fire in REDD+ projects, which are based on forests sequestering and storing carbon). Similarly, the lack

of consideration of mitigation in adaptation projects could lead to increased GHG emissions (Barnett and O'Neill 2010), for example, when the construction of a sea wall is energy intensive and affects adjacent mangrove ecosystems that store carbon.

The interactions between adaptation and mitigation can also be positive or mutually reinforcing (Locatelli et al. 2011). For example, mitigation strategies based on introducing improved cooking stoves could lead to improved health and less fuelwood consumption and ecosystem degradation, all of which can result in increased resilience. Similarly, adaptation measures such as agroforestry and land restoration can lead to more carbon sequestration and storage and limit emission leaking (e.g. deforestation) in the same place or elsewhere. Both adaptation and mitigation can have positive effects on other sectors and enhance non-climate related objectives (e.g. in agriculture, health, transport and energy). Furthermore, both adaptation and mitigation are linked to biodiversity. Strong associations exist between biodiversity richness and carbon stocks (Strassburg et al. 2010), biodiversity and delivery of ecosystem services (Cimon-Morin et al. 2013), and biodiversity and resilience of socioecological systems (Sandifer et al. 2015).

The idea of pursuing both climate strategies simultaneously in policy and practice has been gaining momentum. It is based on increasing the efficiency and effectiveness of climate financing, producing an impact that is greater than the sum of effects related to implementing adaptation and mitigation separately and limiting negative spillovers and consequences (Duguma et al. 2014). However, pressing for the joint implementation of adaptation and mitigation carries risks. It might not always be efficient and effective to pursue the two strategies together and prioritizing only win-win measures could lead to neglecting other measures that can effectively contribute to either adaptation or mitigation separately (Moser 2012). But even if adaptation and mitigation are not implemented jointly, it would make sense to examine the interactions between them when designing and implementing policies and strategies. This will minimize potential negative spillovers and can lead

to an increase in co-benefits and mutually reinforcing positive effects.

The concept of policy integration is useful to policy makers and governments for considering the interactions between adaptation and mitigation. Policy integration relates to the management of crosscutting issues in policy making that transcend single-sector boundaries or established policy fields (Meijers and Stead 2004); it refers to both horizontal (e.g. between sectors or departments) and vertical (e.g. between different levels and tiers) integration. Climate change is one such crosscutting issue, which does not just span across distinct land uses; climate change mitigation and adaptation have often been treated as distinct policy fields.

Underdal (1980) describes policy integration as the process of bringing together different constituent elements into a single, unifying concept – or integrating different policy objectives that are usually treated separately, but can influence each other. According to Underdal (1980), this process is made up of three consecutive stages: (1) comprehensiveness to the input stage (acknowledges the broader scope of policy consequences related to different issues and actors, as well as time and space); (2) aggregation to the processing of inputs (evaluates policy alternatives from an ‘overall’ perspective or aggregate measure of utility); and (3) consistency to outputs (permeates different policy levels and government agencies so that the different policy elements are in line with each other). Policy integration concerns both the decision-making and governance processes as well as the policy outputs.

Policy integration, especially when it concerns climate change or environmental issues, is often used interchangeably with other similar terms such as policy coherence, crosscutting policy making, concerted decision-making, policy consistency, mainstreaming and policy coordination (Meijers and Stead 2004; Nunan et al. 2012). Policy coherence is a central component of policy integration as it implies that the incentives and objectives of different policies

are not conflicting (Van Bommel and Kuindersma 2008), but it does not lead to policy integration *per se*. It relates more to policy consistency i.e. the degree to which contradictions between different aims (e.g. related to mitigation and adaptation) and other policy goals (e.g. agricultural development) have been assessed and efforts have been made to minimize the revealed contradictions (Brouwer et al. 2013). Mainstreaming is about inserting certain objectives (e.g. adaptation to climate change) into different sectoral policies or areas of practice (e.g. agriculture) (Kok and De Coninck 2007), but it does not focus on harmonizing the different objectives of climate change mitigation and adaptation.

Most of the thinking on climate policy integration draws from environmental policy integration (EPI), where EPI is generally understood by some scholars as giving principled priority to environmental issues in different policy-making processes (Lafferty and Hovden 2003; Adelle and Russel 2013). Climate policy integration, however, adopts a ‘weaker’ definition of policy integration, where the aims of climate change adaptation and mitigation are harmonized with other policy aims, allowing for the balancing of trade-offs without assigning a principled priority to any one aim (Van Bommel and Kuindersma 2008; Adelle and Russel 2013).

The discussion on policy integration between climate change adaptation and mitigation relates to two dimensions: (1) integrating adaptation and mitigation in climate change policies so that they are understood as multiple goals, trade-offs are assessed and mutually supportive outcomes are sought; and (2) integrating adaptation and mitigation jointly into sectoral policies such as agriculture or forestry in order to balance trade-offs and maximize co-benefits between climate change and other objectives.

This analysis assesses the level of integration of both dimensions within existing climate change and broadly defined land-use policies and strategies in Peru.

2 The climate change policy landscape in Peru

National policies, elaborated in accordance with the country's laws and regulations, define "what must be done" with related goals, objectives and timelines. Different national strategies guide the "how to" for achieving the objectives and goals of national policies. Strategies are temporary and subject to revision every few years (e.g. every 10 years). National plans and programs are action instruments that indicate the concrete steps to be undertaken in order to achieve the strategic objectives.

There are a number of policies, strategies and action plans that aim to address climate change issues in Peru. Some have climate change as their main focus, while others integrate related objectives. The National Environment Policy (2009) for example, includes objectives on the adaptation of society and establishing mitigation measures in line with sustainable development. Climate change concerns are found in almost all policies, strategies and plans from the sectors of environment, forestry, agriculture, disaster risk reduction and management and sustainable development. Adaptation to climate change is one of the five priorities under Strategic Axis 6 *Natural Resources and Environment in Peru by 2021 Bicentennial Plan*, the country's main national plan for development.

To date,¹ there is no climate change law in Peru. Following the 20th Conference of Parties of the United Nations Framework Convention of Climate Change (UNFCCC COP 20), which was hosted in Lima, there are expectations that the Congress of Peru will pass progressive legislation on climate change with links to a green economy agenda. The Ministry of Environment (MINAM), the main institution currently coordinating climate change activities in Peru, was only established in 2008 but there is a long history of climate change institutions and policies in Peru.

In 1993, one year after signing the UNFCCC, Peru established the National Climate Change Commission. In 2002, the Organic Law of Regional Governance (Law no. 27867) decentralized

environmental regulations, and required all regions to formulate a Regional Climate Change Strategy covering both adaptation and mitigation. The first National Climate Change Strategy came into force in 2003, with the draft 2014 revised strategy currently undergoing a public consultation process. The revision will be finalized in 2015 and will include all important adaptation and mitigation priorities for Peru. In 2010, the Climate Change Adaptation and Mitigation Action Plan (PAAMCC) was approved, encompassing a balanced amount of adaptation and mitigation programs.

The National Climate Change Strategy is being revised to reflect institutional and regulatory changes, advances in scientific research related to climate change projections and scenarios, and the need to involve new actors and the public. The revised strategy identifies strategic objectives and proposes related lines of action and progress indicators so that public entities and government sectors deliver adaptation and mitigation products and services that contribute to climate compatible development. The National Climate Change Commission will coordinate and evaluate the integration of the National Climate Change Strategy in the plans and budgets of public entities and sectors at different levels. It will work together with the Ministry of Economy and Finance (MEF) to design an incentive mechanism for integration.

Furthermore, the country has started the Planning Project on Climate Change (PlanCC) that explores the feasibility of different clean or low-carbon development scenarios and promotes their integration in national and regional development planning processes. Peru is also planning to establish a National Program for the Management of Climate Change (CC-PRONAGECC) that will serve as a multi-stakeholder platform to ensure the most effective and efficient use of public resources in tackling climate change. The program will establish a group that will regularly review progress in implementing the National Climate Change Strategy.

Forests are an essential component of Peru's climate change policy landscape, especially with regard to mitigation, as the country hosts the second-largest

¹ The analysis for this report concluded in January 2015.

portion of the Amazon rain forest and is one of the most forested and biodiverse regions in the world. In 2008, Peru joined the Forest Carbon Partnership Facility (FCPF) process by submitting a Readiness Plan Idea Note (R-PIN), which was approved in the same year. Preparation funds for Reducing Emissions from Deforestation and Forest Degradation (REDD+) were granted and the new version of the country's Readiness Preparation Proposal (R-PP) was accepted in 2014. Peru is also a pilot country in the Forest Investment Program (FIP), which supports developing countries' REDD+ efforts, and is an observer of the UN REDD+ program. Several REDD+ projects are underway at the subnational level.

The National Forest Conservation Program for the Mitigation of Climate Change (PNCBMCC) under the Ministry of Environment (MINAM) was created by Supreme Decree N° 008-2010-MINAM as an umbrella program for all government activities related to reducing deforestation. Its main aim is to conserve 54 million ha of tropical forest, encompassing the twin goals of mitigation and sustainable development. The PNCBMCC forest conservation program also serves as the UN REDD+ focal point and leads the development (still underway) of the National Forests and Climate Change Strategy (ENBCC) together with the National Forestry and Wildlife Service (SERFOR) of the Ministry of Agriculture (MINAGRI).

The National Forests and Climate Change Strategy has three principle aims related to: economically competitive mitigation; adaptation for both people

and ecosystems; and sustainable increase of forest value (forest goods and services). The National REDD+ Plan will be embedded in this strategy. Working together with MINAGRI, the PNCBMCC is also contributing to the development of four Nationally Appropriate Mitigation Actions (NAMAs) related to coffee, cocoa, palm oil and livestock. Additionally, Peru has begun the process of designing a National Forests and Climate Change Fund to facilitate emission reductions from deforestation and forest degradation and from other ecosystem service transactions.

Peru is now entering the implementation phase of the Climate Change Adaptation and Risk Management Plan for the Agrarian Sector 2012–2021 (PLANGRACC-A) elaborated by MINAGRI after extensive consultations with all 25 administrative regions of the country.

Other related policies and plans that encompass climate change issues include the National Disaster Prevention and Management Plan, the National Disaster Risk Reduction and Management Policy, the National Environment Policy and National Environment Action Plan, and the National Forestry Strategy and National Reforestation Plan. Adaptation is more the focus of the disaster management plans and policies, while environment policies and plans include both adaptation and mitigation issues. The National Forestry Strategy and Reforestation Plan have a focus on ecosystem services that relate to both adaptation (e.g. water regulation) and mitigation (e.g. carbon capture and storage) although the problem is not directly framed as a climate change one.

3 Methodology

The research design includes the analysis of climate change and land-use related policy documents.

The selection of documents focused on national level laws, regulations, strategies, plans and major programs from national government institutions with regulatory mandates, and cross-sectoral working groups or semi-independent bodies with a mandate to devise strategies or plans in the following sectors: climate change, forestry, agriculture and key environmental policy documents that include a focus on biodiversity and linkages to climate change, disaster risk reduction and management, and development with a focus on agriculture and forestry and land-use policies. In total, we coded 26 policy documents that were available electronically up to November 2014 (see Annex 1 for a full list of policy documents).

The content of the policy documents was coded using a directed coding approach where an initial list of categories was identified in advance of the coding (Weber 1996; Hsieh and Shannon 2005) and was undertaken using NVivo software (QSR 2012). These initial categories were taken from the literature that analyzed interactions between mitigation and adaptation (Klein et al. 2007; Swart and Raes 2007; Verhot et al. 2007; Locatelli et al. 2011; Moser et al. 2012; Denton et al. 2014; Duguma et al. 2014). All text passages that discussed any of the predefined categories were coded accordingly and any further text relevant to synergies that did not fall under these initial categories was coded under a new category.

Relevant categories used in this particular analysis included different types of interactions between adaptation, mitigation and non-climate specific domains, types of co-benefits, actions facilitating synergies, ecosystem services, and linkages between sustainable development and climate. The central categories of “types of interactions” and “trade-offs” identified all text passages that mentioned positive and negative interactions between mitigation and adaptation and between these and non-climate change specific policy domains. Positive interactions

were classified under six different categories that expressed co-benefit relationships, one expressing integration and four negative interactions (trade-offs) categories. These were:

Positive interactions:

1. Adaptation actions or aims that result in mitigation co-benefits
2. Adaptation actions or aims that result in non-climate co-benefits
3. Mitigation actions or aims that result in adaptation co-benefits
4. Mitigation actions or aims that result in non-climate co-benefits
5. Non-climate actions or aims that result in adaptation co-benefits
6. Non-climate actions or aims that result in mitigation co-benefits
7. Integrated actions considering both adaptation and mitigation aimed at enhancing mutual benefits

Negative interactions:

1. Adaptation actions or aims that result in negative impacts on mitigation
2. Adaptation actions or aims that result in negative impacts on non-climate change specific domains
3. Mitigation actions or aims that result in negative impacts on adaptation
4. Mitigation actions or aims that result in negative impacts on non-climate change specific domains

All text passages mentioning ecosystem services, either by using the term ‘services’ or by relevant concepts such as water regulation, were coded under a general category. The same was done for text passages that referred to the links between climate change and development (e.g. impacts affecting development, opportunities for green growth etc.). Although these concepts do not directly relate to the synergies between adaptation and mitigation, they are relevant for both climate strategies. Ecosystem services can facilitate both adaptation and mitigation (Locatelli et al. 2011; Pramova et al. 2012) and so can different development pathways (Kok and

De Coninck 2007), while at the same time other pathways can either increase vulnerability to climate and/or increase GHG emissions.

In addition, metadata of the policy documents were also coded identifying the name, date, type of document, lead institutions and main sector of each document. When coding the interaction types, we coded according to what was explicitly mentioned. For example, if an adaptation strategy mentioned reforestation, the mitigation co-benefit was only coded if it was described in terms of carbon sequestration, reduction of GHG emissions and other related concepts. Likewise, adaptation co-benefits were coded only when they were mentioned

explicitly e.g. resilience, reduction of vulnerability, decreased drought risk, protection from flood, etc.

We analyzed the coding both quantitatively and qualitatively, assessing which positive and negative interactions were considered, how this changed over time and we highlighted key differences across types of interactions and how they were portrayed in different policy documents. This allowed us to draw some implications about the extent to which policies were attentive (or not) to possible interactions between adaptation, mitigation and non-climate objectives and the extent to which the policy architecture and policy priorities considered integrated approaches.

4 Results

4.1 Interactions

Most of the text passages related to interactions between adaptation and mitigation, or between one of the two climate strategies and other objectives, fell under the “co-benefits” type and specifically under “mitigation with other co-benefits” type where we coded 116 text passages in 13 documents (Figure 1).

4.1.1 Co-benefits of mitigation

The majority of the text passages under “mitigation with other co-benefits” were from forests and mitigation policies such as the Forest Investment Plan (41 references), FCPF Readiness Plan Proposal (14 references), Peru Emission Reductions Program Idea Note (ER-PIN FCPF; 13 references) and general climate change policy documents such as the PAAMCC (11 references) and the Second National Communication to the UNFCCC (10 references). This demonstrates that development benefits and other socioeconomic and environmental benefits are clearly considered in forest-based mitigation strategies (Figure 2).

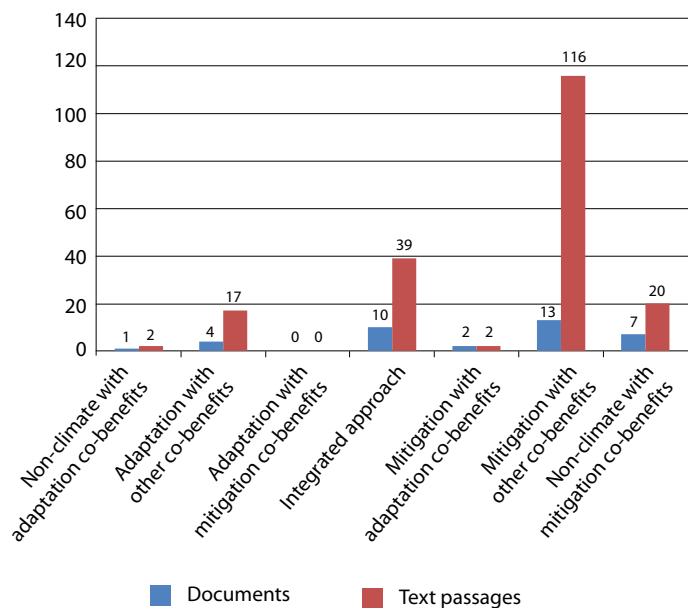


Figure 1. Number of documents and text passages coded under the different types of synergy.

Solving governance issues (e.g. recognition of tenure and rights, collective and participatory forest management, etc.), providing development benefits through an enhanced productive forest sector, and protecting the environment and biodiversity, are all fundamental requirements for sustainable forest-based mitigation, which are mentioned in most of the related strategies, plans and policies in Peru.

The Forest Investment Plan (FIP) outlines developing governance instruments and assigning land rights to communities (governance co-benefits) and discusses development co-benefits linked to ecotourism, ecosystem service valuation, low-emission rural development, sustainable forestry and enhancing forest product competitiveness. Co-benefits to agriculture are also articulated resulting from territorial zoning, which will facilitate agricultural intensification and the restoration of degraded lands. Biodiversity will be supported by all conservation and restoration activities (environment and biodiversity co-benefits). The co-benefits described in the FCPF documents follow similar lines.

The PAAMCC contains forest conservation and restoration projects (with the main purpose of mitigation) that will also result in: development and livelihood benefits (from sustainable management of forest goods and services), strengthening of the forestry sector and enhancing of biodiversity. The plan also includes other non-forest projects such as the introduction of improved cooking stoves (mitigation coupled with health and forest and environment benefits).

Lastly, only two text passages were found that described the adaptation co-benefits of mitigation. The PAAMCC mentioned the design of a plantation forestry program eligible for the Clean Development Mechanism (CDM) that would promote adaptation as a side benefit by reducing desertification and poverty. The FIP listed several co-benefits, including increased resilience of forested landscapes to climate variability and change.

4.1.2 Co-benefits of adaptation

Co-benefits resulting from adaptation actions were less numerous than those resulting from mitigation actions

and were described in the PAAMCC (12 references). The related text passages were from ecosystem-based strategies such as sustainable watershed management, soil conservation and reforestation, and thus most of the co-benefits were linked to environment and biodiversity, as well as to forestry. Any additional mitigation co-benefits that might occur from these strategies were not mentioned. Other co-benefits, such as livelihood and agriculture, were only mentioned in six and five text passages, respectively.

One example from the Adaptation and Mitigation Action Plan was a proposal to implement adaptation measures in prioritized watersheds in Mayo, Santa, Piura, Mantaro, Caplina, Locumba, Chili and Ica. The main objective was to implement integrated watershed management to reduce the adverse effects of climate change, desertification and drought. Activities included the improvement and recovery of wetlands, grasslands and degraded soils in basins, the restoration of vegetation, and reforestation, all of which are expected to bring co-benefits related to environment and biodiversity. The Integrated Watershed Management Plans to be developed are also expected to include payment for ecosystem services (PES) schemes and capacity-building programs to foster sustainable development projects (co-benefit for development).

In general, the co-benefits of adaptation linked to development were not clearly articulated in many of the policy documents analyzed. But this could be because it is well understood that adaptation in any sector is good for overall development, while the links between mitigation and development are less clear and there is more pressure to articulate that mitigation actions do not hinder development. Furthermore, ecosystem-based strategies such as soil conservation and reforestation are likely to contribute to mitigation as well, even when mitigation objectives are not included in the design of the strategies.

4.1.3 Integrated approaches

Text referring to an integrated approach is mostly identified in newer policies such as the draft National Forests and Climate Change Strategy (ENBCC 2014) and the draft of the revised National Climate Change Strategy (NCC 2014) with 14 and six text passages respectively. Both strategy documents include a landscape approach to ecosystem management, i.e. the different ecosystem services (for adaptation, mitigation, livelihoods, etc.) and their linkages are considered.

In the ENBCC, it is stated, for example, that the strategy is based on the sustainable management of forested landscapes and the consideration of the different mosaics of land uses, policies, institutions, norms, technologies, stakeholders, markets and finances. The NCC prioritizes five themes under which synergistic plans and actions could be developed – air, water and soils, forests, biodiversity, and ecosystems and landscapes.

In terms of finance, field interventions based on the double objective of adaptation and mitigation will be given higher priority due to their efficiency according to the ENBCC. Such interventions include those related to forest conservation and sustainable forest management, the management of secondary forests, and reforestation (especially in watersheds) that are expected to deliver multiple ecosystem services. The NCC also aims to promote PES mechanisms that will favor the joint objective of climate risk management and the reduction of GHG emissions.

Information and monitoring, reporting and verification (MRV) systems under the ENBCC will include both adaptation and mitigation data related to forest cover, meteorological trends and hazard risks, safeguards, vulnerability and delivery of ecosystem services.

The National REDD+ Plan, which is embedded in the ENBCC, recognizes the key role of REDD+ in maintaining the resilience of natural and socioeconomic systems, a role that clearly goes beyond mitigation. In the plan it is stated that REDD+ will contribute to the three objectives of the ENBCC, which are: economically competitive mitigation, adaptation for both people and ecosystems, and sustainable increase in forest value (forest goods and services). Peru will seek to maximize the synergies between REDD+ and other adaptation, mitigation and forest management mechanisms.

Additionally, the draft of the revised National Climate Change Strategy (NCC) has a focus on cities and technologies that are both low carbon and resilient to climate hazards. The NCC further underlines the synergies between biodiversity and climate change, where the resilience of ecosystems needs to be built so that they can continue to provide important services for adaptation.

In the other documents where we found some text passages to an integrated approach (e.g. the

PAAMCC and the Mitigation Action Plan and the first National Climate Change Strategy) the text is mostly referring to general actions of forest ecosystem management for reducing vulnerability and enhancing carbon sequestration and storage. A strategic framework for achieving this is not discussed.

4.1.4 Benefits of non-climate activities and plans for adaptation and/or mitigation

Text passages describing the adaptation or mitigation co-benefits of activities and plans that do not address climate change as their primary objective were mostly found in the National Forestry Strategy (2002) and National Reforestation Plan (2005) with six and five text passages, respectively. These text passages relate to forestry activities such as establishment of plantations and sustainable forest management, and the subsequent co-benefit of carbon sequestration and storage.

The 4th National Communication (2011) to the United Nations Convention to Combat Desertification (UNCCD) also mentions that more than a quarter of the projects to combat desertification are designed to deliver global benefits such as carbon sequestration and biodiversity conservation. These benefits are

expected to materialize through land restoration and reforestation.

Finally, only two text passages describe the adaptation co-benefits of non-climate activities or plans and these are included in the 4th National Communication to the UNCCD, where reversing dry-land degradation is linked to drought resilience and reducing climate change impacts overall.

4.1.5 Trade-offs

We also searched for text mentioning trade-offs between the different climate objectives of adaptation and mitigation, and trade-offs between climate strategies and other national priorities related to development, conservation, gender equality and poverty alleviation, and we found almost no text passages. Only three documents mentioned that mitigation strategies could potentially bring about trade-offs in other sectors. The Readiness Plan Proposal and the Peru Emission Reductions Program Idea Note (ER-PIN) submitted to the Forest Carbon Partnership Facility (FCPF) outline the need to monitor both positive and negative potential impacts in relation to: indigenous rights, ecosystem and community resilience, migration, gender equality and food security, among other issues.

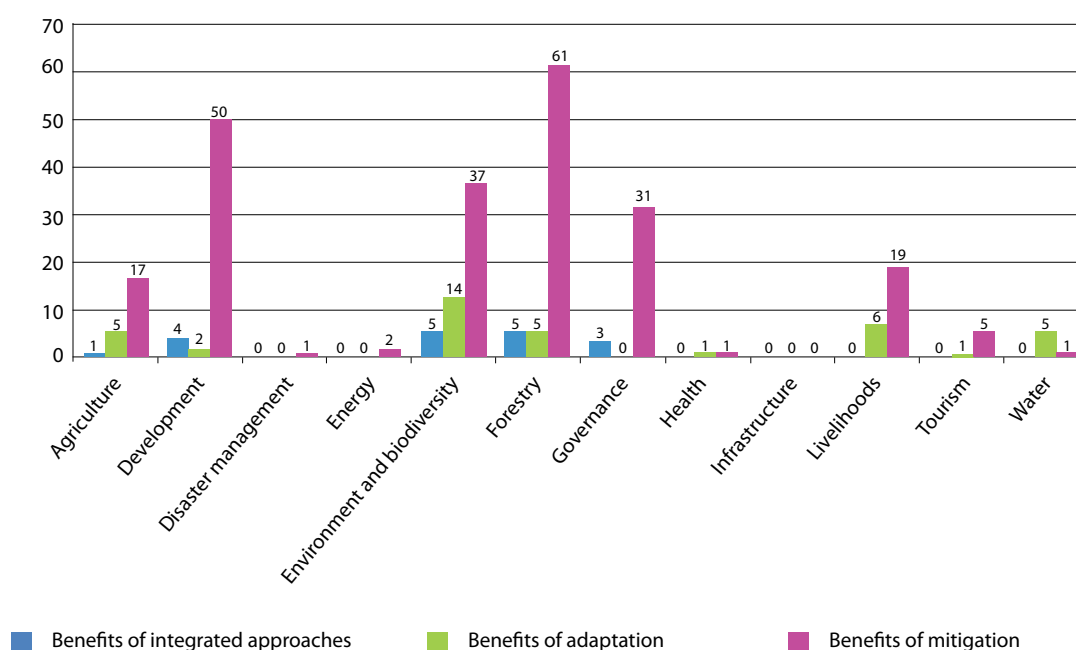


Figure 2. Types of benefits expected from adaptation and mitigation actions by sector or thematic area.

4.2 Ecosystem services

Ecosystem-based interventions are given high priority in Peruvian policy documents; the need to value ecosystem services and integrate them in climate change strategies and sustainable development planning is also important. The importance of ecosystem services are discussed in all but two documents, with the most text passages found in the Climate Change Adaptation and Risk Management Plan for the Agrarian Sector 2012–2021 (PLANGRACC-A, 52 references), the National Forestry Strategy (28 references) and the National Forest Conservation Program for Climate Change Mitigation (PNCBCC, 24 references). We coded a total of 296 text passages in 26 sources.

Many of the interventions in PLANGRACC-A are based on the ecosystem services of forested watersheds and riverbanks for regulating water flows and erosion. Reforestation in different areas is also proposed for maintaining hydrological resources and reducing drought impact in agriculture. For example, in the districts of Cuispes and San Carlos of the Bongará province, watersheds will be reforested to reduce the risk of flooding. Native species that can bring timber production value will be chosen for this purpose. In the Bagua province, reforestation will aim to conserve water and reduce drought risk within the Amojao irrigation project. Sustainable pasture management and agroforestry are other activities that are proposed for the majority of the provinces covered by PLANGRACC-A.

The National Forestry Strategy stresses the importance of forest ecosystem services under a broader socioeconomic development lens (that does not focus on climate change issues). And while the PNCBCC has a predominantly mitigation focus, the importance of ecosystem services for adaptation, development and ecosystem resilience is frequently discussed in the document. For example, sustainable forest management for production systems and poverty alleviation is proposed. Increasing the value and extent of forest ecosystem services and sustainably managing them for socioeconomic development and ecological resilience is a central theme in PNCBCC and in the draft National Forests and Climate Change Strategy (ENBCC).

The PAAMCC mentions the conservation of fragile ecosystems as a priority adaptation measure in different areas of the country for both ecosystem resilience and human well-being. The importance

of analyzing the effects of climate change on the ecosystem services themselves, including water regulation and carbon sequestration, is another important point which relates to both adaptation and mitigation.

Similarly, the Action Plan encourages the identification of silvicultural and agroforestry production systems that are both sustainable and efficient in sequestering carbon for climate change mitigation purposes. Although the adaptation goal is not explicit in this specific example, sustainable production systems are likely to contribute to adaptation as well, through the delivery of ecosystem services and the provision of diversified and resilient income sources. The ecosystem services approach can foster the integration of adaptation and mitigation without the need for a forced marriage in policies, provided that synergies are maximized and trade-offs are properly analyzed and managed.

In June 2014, the Peruvian congress approved the Compensation Mechanisms for Ecosystem Services Law (Law no. 30215, 29 June 2014). The specific regulation mechanisms for its implementation are yet to be defined. Nevertheless, the law represents significant progress towards embracing the ecosystem services approach, as it clearly defines the different elements of a payment for ecosystem services (PES) scheme and the role of the government in supporting and promoting PES. The law also establishes a national registry for PES schemes.

4.3 Climate change and development

Climate change affects development and also offers opportunities for pursuing it sustainably. Adaptation and mitigation both have links to development and to poverty reduction and related text passages were found in almost all of the documents.

In the policy documents analyzed, climate change was most frequently linked to development through concepts such as low-carbon growth, low-emission sustainable development and the CDM. The draft of the new National Climate Change Strategy for example, mentioned that its frameworks are designed to foster a level of development that is both satisfactory and sustainable, and that is based on a low-carbon economy. The PAAMCC refers to the CDM as a good mechanism for supporting sustainable development.

The challenges that climate change poses in achieving development are also frequently discussed in terms of climate change impacts and risks. In Peru's Second National Communication to the UNFCCC, it was mentioned that climate change threatens to reverse development gains and progress made towards achieving the Millennium Development Goals (MDGs). The National Disaster Prevention and Management Plan refers to natural disasters (including climatic ones) and their negative effects on sustainable development. Preventing disasters and increasing the resilience of development is essential.

The National Environmental Action Plan 2011–2021 underlines the urgency of adaptation for development and that the benefits of adapting will far surpass the costs. In the Second National Communication to the UNFCCC, the rhetoric is even stronger, stating that it is priority that the country stops considering climate change as an environmental issue but rather as a development issue. Adaptation should thus not be treated separately to development and the two should go hand in hand.

Forests have a special place in fostering the linkages between climate change and development in Peru. The National Forest Conservation Program for Climate Change Mitigation (PNCBCC) aims to conserve 54 million ha of forests as a contribution to both mitigation and development. The Second National Communication to the UNFCCC mentions reduction of deforestation as a way to balance adaptation, mitigation and sustainable development objectives.

Given that the linkages between adaptation, mitigation and development are recognized in Peruvian policy documents, there are calls to mainstream the two climate strategies into development and sectoral planning. The PAAMCC for example incorporates a whole thematic priority

related to incorporating climate change strategies into development programs and the projects and initiatives of different sectors.

In terms of adaptation, the National Disaster Prevention and Management Plan stresses the need to incorporate risk management in planning processes across sectors and levels and the draft new National Climate Change strategy seeks to capacitate public officials in incorporating climate change risks into public and sectoral planning. The Second National Communication to the UNFCCC underlines that adaptation must be integrated into the national and subnational planning and decision-making processes.

Very few text passages were found where the mainstreaming of mitigation specifically is discussed in detail. Mitigation is mostly discussed in terms of low-carbon growth pathways (generally speaking), and not so much in terms of integrating mitigation issues into specific sectoral and development strategies. Perhaps this is understood under the general call for mainstreaming the concern about climate change more broadly in the economy and society.

Furthermore, most of the text passages identified linking climate change issues with development are from climate change related policies and not from general development planning documents (e.g. Peru by 2021 Bicentennial Plan) or sectoral ones (e.g. Multiyear Strategic Plan for the Agrarian Sector 2012–2016). The principal development plan, Peru by 2021 Bicentennial Plan, which also outlines the country's vision for development, includes only two such text passages. The first one mentions that mitigation offers opportunities for development and the other that vulnerability and risk reduction should be supported within a framework of sustainable development and beneficial adaptation opportunities exploited.

5 Discussion

Peruvian climate change and land-use related policies showcase a number of examples of adaptation–mitigation interactions, mostly through an ecosystem or landscape approach. These approaches have potential for integrating adaptation, mitigation and other sectoral objectives, but central questions remain such as how will the different policies influence ecosystem services and development pathways across objectives and sectors, and how will trade-offs be managed. Perhaps before anything else, a sustainable knowledge and information generation and sharing system needs to be established, to aid policy impact evaluation and the assessment of policy coherence, the implementation of adaptive management, and ultimately to support integrative planning.

Although the PAAMCC treats adaptation and mitigation in separate sections and geographical areas, the links between the two climate objectives are illustrated when the co-benefits of the different strategies are discussed. The new draft of the National Climate Change Strategy and the National Forests and Climate Change Strategy provide frameworks for integrating adaptation and mitigation objectives in the same action or strategy for joint implementation. These two strategies can also serve as an example of policy integration. Through the ecosystem and resilient city approaches, the new draft of the National Climate Change Strategy aims to integrate both adaptation and mitigation in coherent and holistic action plans. The forest landscape approach of the National Forests and Climate Change Strategy brings together adaptation, mitigation and forest sector development (e.g. productive forest-based economies). It is in this latter policy where integrated planning takes place between the Ministry of Environment (responsible for climate change matters) and the Ministry of Agriculture (responsible for forest matters).

The potential of ecosystem-based activities and the landscape approach to deliver co-benefits across objectives and sectors is recognized in many policy documents. Existing scientific evidence suggests that ecosystem-based adaptation can be an effective strategy to increase the resilience of people while at the same time delivering co-benefits across sectors (Pramova et al. 2012; Doswald et al. 2014). Both

marine (Sutton-Grier et al. 2014) and terrestrial ecosystems (Houghton 2012) are vital for storing and sequestering carbon.

Ecosystem strategies can be integrated into a broader landscape approach to balance climate change, biodiversity and development objectives. Landscape approaches are already discussed in the National Forests and Climate Change Strategy and in the revised National Climate Change Strategy. The latter also emphasizes the links between biodiversity and the delivery of ecosystem services relevant to adaptation and mitigation. The landscape approach is broadly defined as “a framework to integrate policy and practice for multiple land-uses, within a given area, to ensure equitable and sustainable use of land while strengthening measures to mitigate and adapt to climate change” (Reed et al. 2014, 1). However, it is still unclear how the two climate strategies relate to each other. The same is true for most policies that incorporate ecosystem-based strategies and there can be trade-offs even between different ecosystem services (Locatelli et al. 2008; Pramova et al. 2012).

The ecosystem and landscape approaches recognize that multiple trade-offs can occur in relation to adaptation, mitigation, development and other policy priorities. Balancing trade-offs is especially relevant in landscape management where multiple land uses interact. Both approaches do however offer frameworks for assessing and balancing trade-offs during implementation and for working towards policy coherence and integration. For example, assessing the current and potential impacts of different policies on the goods and services provided by ecosystems gives a holistic view of policy coherence from an ecosystem service perspective and can foster new types of policy debates (Makkonen et al. 2015).

Such an assessment related to forest mitigation services was conducted in Finland and revealed an imbalance between promoting bioenergy and carbon sequestration in favor of the former (Makkonen et al. 2015). Furthermore, it was shown that the specific bioenergy policies tend to induce trade-offs between ecosystem services, while the more general policies

promote the supply and demand of both bioenergy and carbon sequestration. As almost all climate change and land-use related policies in Peru include priorities or strategies that target or impact ecosystem services, it makes sense to use this kind of assessment, but include a broader array of services.

As Moser (2012) has suggested, assessments can go further and examine each policy's implications on the potential action space for enacting complementary climate or other policies in the present or future. Common policy tools that are already available can be used for this purpose, such as specifically designed environmental impact assessment (EIA) tools.

The landscape approach, which can encompass ecosystem-based strategies, necessitates involving multiple actors across sectors and levels in order to best manage multiple land-uses for agriculture, settlements, conservation, industry and other objectives across time. As the approach is inherently cross-sectoral it can promote policy integration that goes beyond assessing trade-offs (Reed et al. 2014). Experience from Denmark has shown that landscape strategy making is a promising way of improving policy integration in rural contexts, although more efforts are needed to engage large-scale intensive farming with community-based priorities and practices (Primdahl et al. 2013). Similarly, Biesbroek et al. (2009) view spatial planning, one of the tools of landscape management, as a switchboard for integrating adaptation, mitigation and sustainable development.

In terms of implementation, any strategy related to ecosystems and landscapes must: recognize uncertainty, involve actors across disciplines, sectors and levels, and be pursued through adaptive management (Reed et al. 2014; Richter et al. 2014). The sustainability of such initiatives will depend on fostering continuous knowledge generation and reevaluation of objectives, and stakeholder engagement based on an evolving, shared vision (Richter et al. 2014). This includes the monitoring and evaluation of policy impacts on ecosystem services and the different national and subnational priorities.

The ideas of integration, for example through ecosystem and landscape management, are present in several policies but there is an overarching gap in terms of information and knowledge generation and management. With the exception

of PLANGRACC-A, plans and strategies are not based on vulnerability analyses, which are largely missing in Peru. Future climate projections are often based on global models at a coarse resolution, which limits their value for decision-making at the regional and local level. Seasonal and inter-annual forecasts are issued from multiple sources and are conflicted, thus reducing the confidence of decision-makers in using them (Dilling and Lemos 2011). This presents a problem of information management across institutions.

Things seem to be a little more advanced in terms of mitigation, especially with the Planning Project on Climate Change (PlanCC), which is a multi-actor, multi-sectoral initiative led by MINAM to develop different plausible scenarios of economic growth linked to reduced carbon emissions. But the resilience of the different growth pathways in terms of climate change impacts is uncertain. Information relevant for both adaptation and mitigation, which is easily accessible and usable by a variety of different stakeholders, is needed to examine synergies and trade-offs between the two climate strategies and consider policy coherence and integration. Information and knowledge mechanisms (both traditional and indigenous) are also vital components of adaptive management (Olsson et al. 2004).

Climate change needs to link more strongly with development concerns in Peru. Several authors, organizations and funds that provide climate financing, argue that adaptation and mitigation can be integrated effectively by mainstreaming a broader concept of climate change into development planning (Kok and de Coninck 2007; Swart and Raes 2007; Moser 2012). Dang et al. (2003) suggest that mainstreaming will not be a versatile and lasting approach if adaptation and mitigation are handled separately from one other in climate change strategies – as the ability to adapt is linked to the ability to mitigate and *vice versa*. The new National Climate Change Strategy of Peru is taking a step toward integrating adaptation and mitigation and this can pave the road for more effective integration.

What is largely missing is a discussion on climate compatible – or climate-smart – development. Climate compatible development is where adaptation, mitigation and development come together in triple-win strategies. It is development that minimizes the harm caused by climate impacts, while maximizing the many development

opportunities presented by a low-emission, more resilient, future (Mitchell and Maxwell 2010). It puts development and poverty reduction at the heart of both adaptation and mitigation, while ensuring that trade-offs are balanced where triple wins cannot be achieved.

In Peru however, climate change seems to be more of an “environmental” problem under the leadership of the Ministry of Environment (MINAM) and not

an issue that is of primary development concern or fully integrated into other planning processes. A Climate Change Commission exists, which groups actors from all sectors and types of organizations, but it meets sporadically. Until both adaptation and mitigation become important policy objectives for development across ministries connected with land use, including in the Ministry of Finance, maximizing the synergies between adaptation and mitigation will be difficult.

6 Conclusion

Climate change considerations are evident in the land-use related policy priorities of Peru and national strategies and plans encompass both adaptation and mitigation objectives. Frameworks have been developed for the integrated implementation of adaptation and mitigation in the new National Climate Change Strategy and draft National Forests and Climate Change Strategy. Different ministries also work together in planning, breaking the sectoral barrier to some extent, as evidenced by the joint collaboration of the environment and agriculture ministries in the design of the National Forests and Climate Change Strategy (which incorporates a forest landscape approach). How the different policies relate to each other though is not clear.

Many of the strategies outlined in the different policy documents do not explicitly mention achieving both adaptation and mitigation objectives jointly. There is however a strong focus on delivering ecosystem services in most of the policies analyzed. And enhancing ecosystem services can ultimately be beneficial for both adaptation and

mitigation, and for other national priorities such as biodiversity conservation.

What is needed is a strong focus on information and knowledge generation and management, and an assessment of the current and potential impacts of national and subnational policies on ecosystem services at different scales. Establishing mechanisms for monitoring and evaluating policy implementation, stakeholder engagement and adaptive management should be another high priority. A further step forward would be to mainstream a broader concept of climate change, such as the one related to climate compatible development, and landscape approaches in land-use sector policies and policy processes. This will facilitate policy integration and synergies between adaptation, mitigation, socioeconomic development and biodiversity conservation. A revived and empowered Climate Change Commission with the participation of multiple stakeholders engaged in adaptation, mitigation and development, can play an active role in achieving this.

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Annex 1. List of policy documents analyzed

	Title of policy document	Publication yr
1	Draft 2014 National Climate Change Strategy	2014
2	Draft National Forests and Climate Strategy	2014
3	Forest Investment Plan	2014
4	National Ecosystem Services Law	2014
5	National Forest Conservation Programme for Climate Change Mitigation	2014
6	Peru Emission Reductions Program Idea Note (ER-PIN FCPF)	2014
7	Forest Carbon Partnership Facility Readiness Plan Proposal	2013
8	Multiyear Strategic Plan for the Environment Sector 2013-2016	2013
9	National Forest and Forest Wildlife Policy	2013
10	Policy Guidelines for Territorial Zoning	2013
11	Climate Change Adaptation and Risk Management Plan for the Agrarian Sector 2012-2021	2012
12	Multiyear Strategic Plan for the Agrarian Sector 2012-2016	2012
13	Desertification in Peru: Fourth National Communication to the CCD	2011
14	National Environmental Action Plan 2011-2021	2011
15	National Forest and Forest Wildlife Law	2011
16	Peru by 2021 Bicentennial Plan	2011
17	Climate Change Adaptation and Mitigation Action Plan	2010
18	National Climate Change Scientific Research Agenda	2010
19	National Disaster Risk Reduction and Management Policy	2010
20	National Environment Policy	2010
21	Second National Communication to the UNFCCC	2010
22	National Reforestation Plan	2005
23	National Disaster Prevention and Management Plan	2004
24	National Rural Development Strategy	2004
25	National Climate Change Strategy	2003
26	National Forestry Strategy	2002

Annex 2. Definition of interaction types

Category	Sub-category	Description	Positive relationship	Negative relationship
Type of interactions		Any type of linkages between mitigation and adaptation and between any of the two and non-climate change specific domains.		
	1. Co-benefits/trade-offs		+	-
	2. Integrated approach		++	
1. Co-benefits/trade-offs		Text passages referring to co-benefits/trade-offs between adaptation, mitigation and/or non climate change specific domains		
	a. Adaptation with mitigation co-benefits/trade-offs	Text passages on adaptation resulting in co-benefits/trade-offs for mitigation	a → +A+M	a → +A-M
	b. Adaptation with other co-benefits/trade-offs	Text passages on adaptation resulting in co-benefits/trade-offs to non-climate change specific domains	a → +A+X	a → +A-X
	c. Mitigation with adaptation co-benefits	Text passages on mitigation resulting in co-benefits to adaptation	m → +M+A	m → +M-A
	d. Mitigation with other co-benefits/trade-offs	Text passages on mitigation resulting in co-benefits other than adaptation	m → +M+X	m → +M-X
	e. Non-climate action with co-benefits/trade-offs for adaptation	Text passages referring to non-climate change strategies or actions resulting in co-benefits to adaptation	x → +X+A	not coded
	f. Non-climate action with co-benefits/trade-offs for mitigation	Text passages referring to non-climate change strategies or actions resulting in co-benefits/trade-offs for mitigation	x → +X+M	not coded
2. Integrated approach	g. Integrated approach	Text passages related to pursuing both adaptation and mitigation objectives in an integrated manner with similar or complementary measures, where it is clear that they should be pursued together.	a&m → +AA+MM	

(a: adaptation objective, m: mitigation objective, x: non-climate related objective, []: secondary objective, →: results in, +: positive outcome, -: negative outcome, A: adaptation outcome, M: mitigation outcome, +AA or +MM increased outcome as a result of an interaction between A and M, -AA or -MM decreased outcome as a result of an interaction between A and M, frequency * less than 5% of the 274 cases, ** 5-10%, *** 10-25%, **** more than 25%)

CIFOR Working Papers contain preliminary or advance research results on tropical forest issues that need to be published in a timely manner to inform and promote discussion. This content has been internally reviewed but has not undergone external peer review.

The interactions between climate change adaptation and mitigation are particularly evident in agriculture, forestry and other land-use-based activities. Adaptation projects can affect ecosystems and their ability to sequester and store carbon, while mitigation projects can enhance adaptive capacity or increase the vulnerability of people. These interactions must be considered when designing policies and strategies.

The discussion on policy integration of climate change adaptation and mitigation should focus on two issues: (1) integrating adaptation and mitigation in climate change policies to consider multiple goals, assess trade-offs and seek mutually supportive outcomes; and (2) integrating adaptation and mitigation jointly into sectoral policies, such as agriculture or forestry, in order to balance trade-offs and maximize co-benefits between climate change and other objectives.

National strategies and plans related to climate change in Peru as well as key land-use policies encompass both adaptation and mitigation objectives. Frameworks have been developed for the integrated implementation of adaptation and mitigation in the new National Climate Change Strategy and draft National Forests and Climate Change Strategy. Although most of the other strategies and action plans do not mention the joint implementation of adaptation and mitigation, they do emphasize delivery of ecosystem services. And enhancing ecosystem services can ultimately benefit both adaptation and mitigation and other national priorities.

What is needed is a strong focus on information and knowledge generation and management and an assessment of the current and potential impacts of national and subnational policies on ecosystem services at different scales. Establishing mechanisms for monitoring and evaluating policy implementation, stakeholder engagement and adaptive management are also crucial.



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