UN-REDD PROGRAMME

INFO BRIEF

REDD+ and adaptation: Identifying complementary responses to climate change

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December 2014

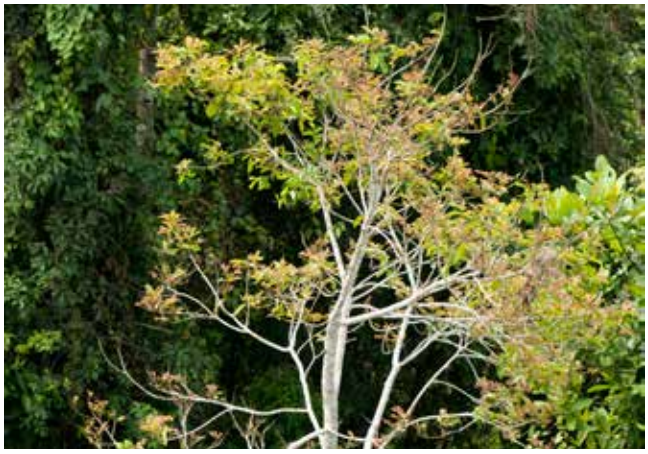
KEY MESSAGES

- A number of decisions under the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD) recognise the potential for synergies between climate change mitigation and adaptation actions.
- REDD+ and adaptation actions can be complementary, although REDD+ actions will not be able to achieve all adaptation goals, and adaptation actions will not be able to achieve all REDD+ goals.
- Ecosystem-based adaptation to climate change (EBA) may help to achieve REDD+ objectives. For example, conserving mangrove forests to counter storm surge flooding can also reduce greenhouse gas emissions.
- Adaptation actions can decrease the risk of reversals of emission reductions by: (i) modifying future drivers of land-use change; and (ii) supporting forests to adapt to climate change through actions that maintain characteristics of resilient ecosystems.
- The implementation of REDD+ activities can maintain and enhance ecosystem services important for societal adaptation.
- REDD+ actions will also influence important aspects of adaptive capacity. For example, training on sustainable management of forests may build human capital for adapting forest use to climate change.
- There are both shared challenges and potential trade-offs between REDD+ and adaptation; the development and application of social and environmental safeguards can help to address some of these.
- Integrating both adaptation and mitigation into wider forest policy and the strategies and plans of related sectors, at local to national scales, can help maximize synergies and minimize trade-offs.
- Experience of joint REDD+ and adaptation actions is still limited. Countries may wish to look for opportunities to link adaptation and mitigation actions and funds, and to document and articulate the benefits at a national level so these experiences can be further shared and learned from by others. Practical guidance on the implementation of joint actions could be developed based on this experience.

[1]United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)

Introduction

The primary purpose of REDD+ is to mitigate climate change by reducing emissions from deforestation and forest degradation, and through the conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks. Mitigation is crucial for limiting the extent of climate change and thus the severity of its impacts on society and ecosystems. However, even with our best mitigation efforts, there will still be changes in the climate system due to inertia. Likely changes for many regions include more frequent and longer-lasting heat waves, more frequent and intense extreme precipitation events, and continued sea level rise[i]. Adaptation[1] strategies and actions that enable society to reduce the adverse consequences of climate change, as well as to harness beneficial opportunities, are therefore critical. Amongst the adaptation activities that would be expected to contribute to REDD+, there are those that help forests to adapt so that they can continue to provide ecosystem services in the face of climate change. Activities to directly help societies adapt to climate change may also be supported by, or may pose risks to, forest ecosystem services. This information brief outlines the relationship between REDD+ and adaptation, including possible mutual benefits and trade-offs. It examines the potential for adaptation, particularly ecosystem-based adaptation (EBA, see Box 1), to contribute to REDD+ goals. The brief explores how adaptation relates to the resilience of carbon stocks and reducing future drivers of land-use change and degradation; and how REDD+ can influence the adaptive capacity of society. Potential challenges to implementing REDD+ and adaptation in mutually advantageous ways are highlighted, as are potential trade-offs that will need to be considered. The brief concludes by offering some options to both REDD+ and adaptation decision-makers for realising the opportunities presented.



Amazone rainforest, Yasuni National Park, Ecuador.

Box 1 – What is ecosystem-based adaptation?

Ecosystem-based adaptation to climate change (EBA) is defined as 'the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people adapt to the adverse effects of climate change'[ii]. Examples of EBA relevant to REDD+ include:

- conservation, sustainable management and/or restoration of hill forests to stabilise slopes, intercept rainfall and dry soils through transpiration, to reduce the risks of shallow landslides[iii] as rainfall intensities and frequencies vary;
- conservation, sustainable management and/or restoration of mangrove forests to reduce the impact of coastal flooding and erosion from storm surges linked to changing frequency and intensity of storms[iv]; and
- establishment of diverse agroforestry systems to provide flexible livelihood and income options to adapt to climatic variability, through the provision of climate-resilient tree and ground crops for human and animal consumption.

[1]Adaptation is adjustment in natural or human systems in response to actual or expected climatic changes or their effects, which moderates harm or exploits beneficial opportunities (adapted from Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden and C. E. Hanson, (eds.), Cambridge University Press, Cambridge, UK, 23-78: Appendix 1, 869-883 Glossary).

Policy background

A number of decisions made under the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD) are relevant to the relationship between REDD+ and adaptation actions.

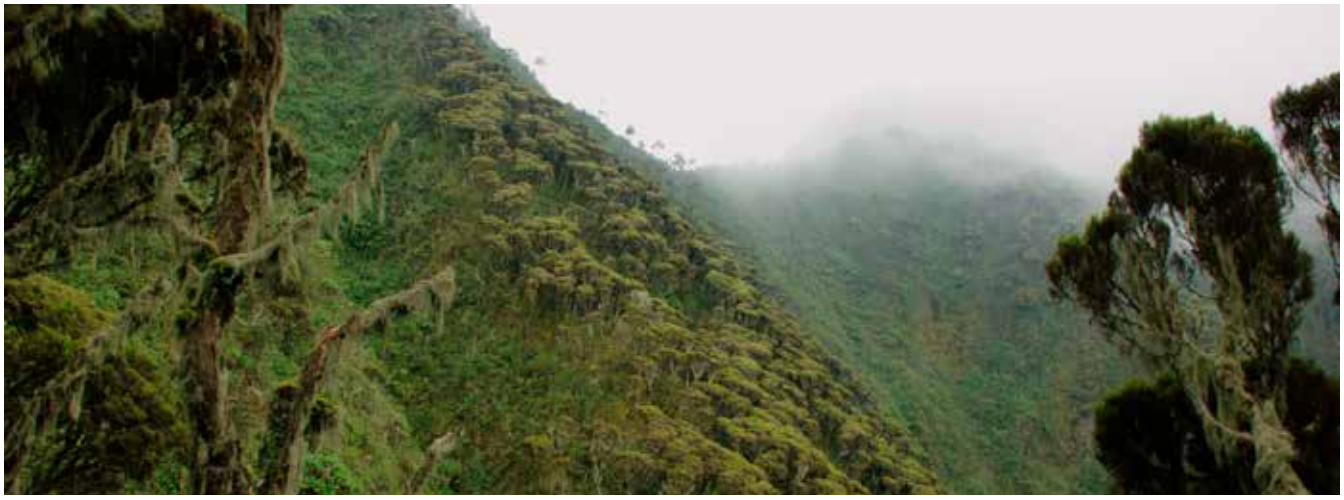
Under the UNFCCC, decision 1/CP.16[2] makes it clear that adaptation must be addressed with the same priority as mitigation by Parties. The set of safeguards that the Parties to the UNFCCC agreed should be promoted and supported when undertaking REDD+ activities (the so called 'Cancun safeguards'), include protecting and conserving ecosystem services and enhancing 'other social and environmental benefits'[3]. Additionally, decision 9/CP.19[4] encourages entities financing REDD+ to provide financial resources for joint mitigation and adaptation approaches for the integral and sustainable management of forests. The decision also recognizes the importance of incentivizing non-carbon benefits for the long-term sustainability of REDD+ activities. Such non-carbon benefits, and the ecosystem services and social and environmental benefits referred to in the Cancun safeguards, could include those relevant to climate change adaptation.

The Aichi Biodiversity Targets of the CBD's Strategic Plan for Biodiversity 2011-2020[5] include Target 15 on conservation, restoration, climate change mitigation and adaptation. Parties to the CBD have also been invited to consider the possible benefits between ecosystem-based approaches for climate change mitigation (including REDD+) and adaptation activities[6]. In addition, Parties are invited to integrate EBA into relevant strategies[7], which could include strategies related to REDD+, and are encouraged to consider reviewing land-use planning with a view to enhancing EBA[8].

The first session of the United Nations Environment Assembly (UNEA) of the United Nations Environment Programme passed resolution 1/8 on EBA[9]. This encourages all countries to include and improve EBA in their national policies, including EBA actions that relate to the sustainable management of forests.

The decisions outlined above have contributed to an increased interest from governments and other stakeholders in exploring the complementarity between REDD+ and adaptation actions.

An example of how REDD+ and adaptation linkages have been reflected in national policy is given in Box 2.



Landscape, Uganda. © flöschen 2011 (CC BY-NC-SA 2.0). https://flickr.com/photos/floeschen/5471077201/in/photostream/

[2]UNFCCC decision 1/CP.16 paragraph 2 (b) http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2
[3]UNFCCC decision 1/CP.16 Appendix 1, paragraph 2(e) http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2
[4]http://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf#page=24
[5]CBD decision X/2 http://www.cbd.int/doc/decisions/cop-10/cop-10-dec-02-en.pdf
[6]CBD decision X/33, paragraph 8(m) http://www.cbd.int/doc/decisions/cop-10/cop-10-dec-33-en.pdf, and the annex of decision XI/19 http://www.cbd.int/doc/decisions/cop-11/cop-11-dec-19-en.pdf
[7]CBD decision X/33, paragraph 8(k) http://www.cbd.int/doc/decisions/cop-10/cop-10-dec-33-en.pdf
[8]CBD decision XI/21, paragraph 6(f) http://www.cbd.int/doc/decisions/cop-11/cop-11-dec-21-en.pdf
[9]UNEP/EA.1/8 on ecosystem-based adaptation http://www.unep.org/unea/docs/Compilation_of_decisions_and%20resolutions_advanced_unedited%20copy.pdf

Box 2 – REDD+ and adaptation policy links at the national level – Philippines case study

The Philippines Climate Change Act (2009) mandated the development of a National Framework Strategy on Climate Change (NFSCC). The NFSCC (2010) is a 12-year plan for climate change adaptation and mitigation. It emphasises that climate change mitigation strategies, including REDD+, can only succeed if undertaken in the context of adaptation. The NFSCC specifically references the National REDD+ Strategy (2010) as an opportunity to strengthen the forestry sector's capacity to adapt to the impacts of climate change by enhancing ecosystem services, clarifying carbon rights and establishing safeguards towards the realisation of multiple environmental and social benefits. The National REDD+ Strategy itself notes that there is a need for legislation and policy measures within the administrative bounds and mandate of the implementing national government agency to ensure that activities within the natural forest do not jeopardise adaptation. The National REDD+ Strategy must be consistent, aligned with national and international laws and agreements, and support the Philippine Development Plan, the National Climate Change Action Plan 2011-2028 (NCCAP), and the updated Philippine Biodiversity Strategy and Action Plan. In addition, Executive Order No.881 authorised the Climate Change Commission to coordinate REDD+ work as part of its role as coordinator of climate change programmes (including adaptation work) of national government agencies.

Following the adoption of the NFSCC, the NCCAP was formulated to outline specific programmes and strategies for adaptation and mitigation. It notes:

'Since most vulnerable communities live in the forests and other critical ecosystems, forest protection and rehabilitation also protects the assets of the poor thereby increasing their ability to cope with natural and economic shocks. […] For this reason, mitigation is an essential component of the adaptation strategy; thus, the carbon market and REDD+ presents opportunities for adaptation financing...' (p. 46).

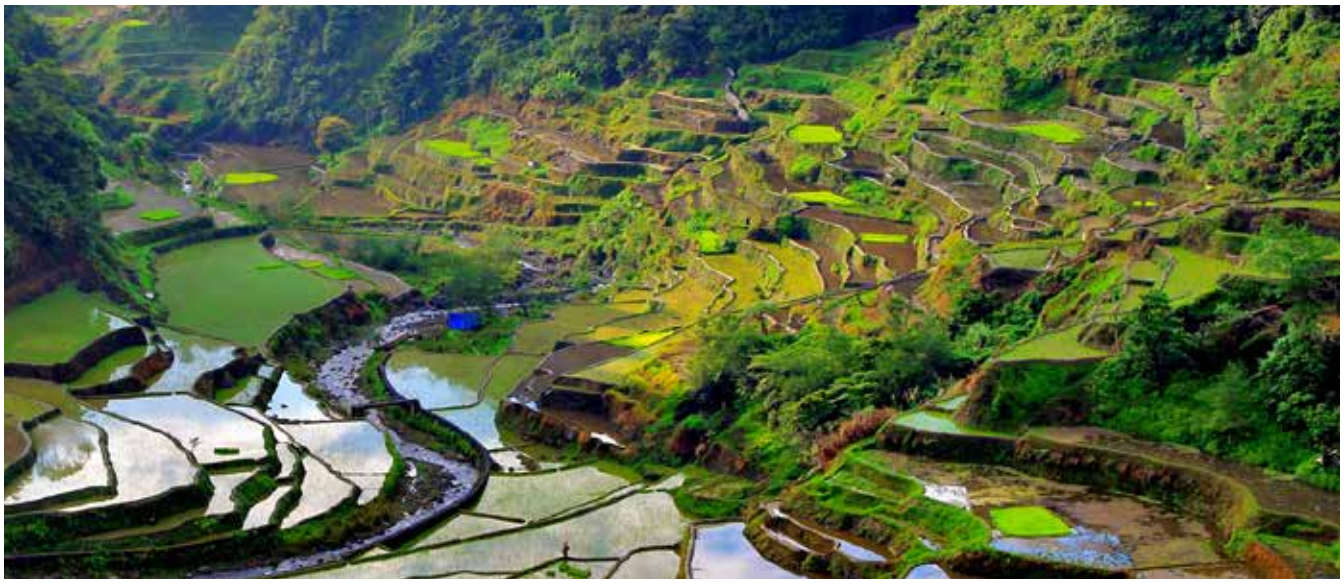
Main lessons from case study: *High level acknowledgement of the potential linkages between REDD+ and adaptation has enabled the development of an integrated action plan that includes activities designed to take advantage of complementarities.*

Sources:

Philippines Climate Change Commission (2010) National Climate Change Action Plan 2011-2028. Philippines Climate Change Commission, Manila, Philippines. http://adaptationmarketplace.org/data/library-documents/NCCAP_TechDoc.pdf

Philippines Climate Change Commission (2010) Philippines National Framework Strategy on Climate Change 2010-2022. http://www.neda.gov.ph/wp-content/uploads/2013/10/nfscc_sgd.pdf

Philippines REDD-Plus Strategy Team (2010) Philippine National REDD-Plus Strategy (PNRPS) http://www.unredd.net/index.php?option=com_docman&task=doc_download&gid=4191&Itemid=53



Banaye, Philippines. ©Just one way ticket 2013 (CC BY-NC-ND 2.0). https://flic.kr/p/eiBWGC

How can climate change adaptation support REDD+?

The choice of climate change adaptation approaches depends on the climate change projected to occur within a region and the local context. Ecosystem services need to be considered in relation to human adaptation because of the dependency of livelihoods and economic sectors on them. In addition, ecosystems can provide a range of adaptation options (see Box 1). Therefore, conserving forests and the ecosystem services they provide can be both an adaptation measure, and contribute to REDD+ objectives at the same time (see Box 3 on the monetary value of such services). For example, **using EBA such as mangrove restoration, rather than hard infrastructural approaches such as sea walls, to adapt to storm surge flooding, can enhance forest carbon stocks** (see Box 4 and UNEP and CIFOR 2014[v]).

EBA actions have the potential to directly reduce both current and future pressures that lead to deforestation and forest degradation. They can therefore help both to reduce emissions and to limit the risk of reversals of emissions reductions and removals. For example:

(i) Implementing agroforestry with resilient tree crops as an EBA intervention can, in an appropriate context, support livelihood diversification in the face of climatic uncertainty. It can also help maintain micro-climatic conditions (including shade for crops confronted by increasing temperatures) and local surface run-off regulation. It may also reduce the pressure on forests for fuel, through providing an alternative source of fuelwood and alternative livelihoods to fuelwood or charcoal production.

(ii) Agricultural adaptation projects aiming to sustain crop productivity may reduce future forest clearing associated with agricultural expansion due to falling productivity.

Considering adaptation needs within REDD+ planning can increase the sustainability of REDD+ actions aimed at reducing deforestation and/or degradation through promoting alternative livelihoods. Future impacts of climate change may undermine these actions if they have not been considered during planning (see charcoal example, Box 5). Working with adaptation practitioners and projects when planning REDD+ actions, including drawing upon climate change impact and vulnerability assessments already undertaken, will help to improve the actions' resilience.

Box 3 – Values of forest ecosystem services related to reducing the impact of climatic hazards

Forests provide a range of services important for regulating the impact of climate-related hazards, including storm protection and erosion control in the face of increasing variability in rainfall. The TEEB database[vi] on monetary values of ecosystem services contains over 1,350 data-points from more than 300 studies. Storm protection by mangrove forests provides estimated values ranging from USD 32/ha/year in Cambodia[vii], to USD 8,017/ha/year in Thailand[viii]. Values of erosion control by mangroves range from USD 97/ha/year in Indonesia[ix] to USD 672/ha/year in the Philippines[x].

A comprehensive study by de Groot et al. (2012)[xi] estimated the value of ecosystem services in monetary units provided by 10 main biomes based on local case studies across the world. The value of erosion prevention in tropical forests was estimated at USD 15/ha/year.

Mangrove, Indian Ocean Coast of Kenya. © Peter Prokosch 2014.

Mangrove, Singapore. © Eustaquio Santimano, 2010 (CC BY-NC-ND 2.0). https://flickr.com/photos/eustaquio/5332643345

Box 4 – Integrating REDD+ into climate change adaptation – Fiji's mangroves case study

The Mangrove Ecosystems for Climate Change Adaptation (MESCAL) Project in Fiji aims to increase climate change resilience and strengthen local livelihoods through supporting adaptive co-management and restoration of mangroves. It is also supporting the REDD+ readiness process in Fiji.

Fiji's mangroves cover an estimated 38,000 hectares (FAO, 2010)[10]. Mangrove forests are being considered as part of REDD+ in Fiji (Senivasa et al., 2014) with the National Climate Change Policy recognising the importance of mangroves for mitigation and adaptation goals: 'Conservation and sustainable management of mangroves will protect a large carbon sink and reservoir, while providing physical foreshore protection, marine breeding grounds, and healthy coral reef systems'. Major threats to mangroves in Fiji are land reclamation for commercial, industrial and residential development, subsistence harvest for fuelwood, pollution, and climate change impacts (including sea-level rise).

The MESCAL project has worked at demonstration sites, such as Nadoi village in the Rewa Delta, to conduct hazard screening exercises with community members. Hazards identified included salt water intrusion, rainfall variation, extreme temperature fluctuation, and flooding. The villagers recently called for the protection of mangrove forests based on their importance for food and livelihoods and for protecting against some of the hazards identified. The mangroves support crab, lobster and shrimp production, and help to accumulate sediment and therefore protect against coastal erosion. In response, the project has worked to improve the availability of comprehensive baseline information on mangrove status, and the awareness of the benefits of mangroves and their conservation. The project has also enhanced the technical capacity on mangrove conservation for climate resilience through testing tools with government officials at demonstration sites.

Through collecting baseline information on mangrove status, the MESCAL project has completed the country's first mangrove forest biomass and carbon inventory (Senivasa et al., 2014). This inventory has contributed to Fiji's REDD+ readiness process. Project outcomes have also fed into an update of the National Mangrove Management Plan by the Ministry of Lands and Mineral Resources.

Main lesson from case study: *Adaptation projects can be useful sources of information when developing national forest monitoring systems, national forest inventories and safeguard information systems, as part of REDD+ readiness actions.*

Sources:

IUCN (no date) MESCAL. http://www.iucn.org/about/union/secretariat/offices/oceania/priorities/priority_naturebasedsolutions/water_wetlands/about/ [accessed 19/09/2014]

WWF (2013) Rewa Delta Calls for Mangrove Protection. http://wwf.panda.org/?209662/Rewa-Delta-Calls-for-Mangrove-Protection [accessed 19/09/2014]

FAO (2010) Country Report: Fiji. FAO, Rome, Italy.

Senivasa, E. et al. (2014) Readiness Preparation Proposal (R-PP) for Fiji. 22 January, Forest Carbon Partnership Facility. https://forestcarbonpartnership.org/sites/fcp/files/2013/Nov2013/2013_11_08_Fiji%20R-final_2dRev.pdf [accessed 11/11/2014]

[10]This represents 3.7% of total forest area. This figure was calculated by applying the following formula to figures included in FAO (2010): (mangrove area/total forest area+mangrove area)*100. This calculation was necessary as mangroves are not included in the total forest are presented in FAO (2010) as the area of mangroves is not included in the total land area.

Agroforestry in Zambia: Faidherbia and Maize © Charlie Pye-Smith 2009 (CC BY-NC-SA 2.0). https://flickr.com/photos/icraf/8636251709/in/photostream/

Box 5 – REDD+ contributing to adaptation - Lower Zambezi REDD+ project case study

The Lower Zambezi REDD+ Project in Zambia is a voluntary carbon market project run by BioCarbon Partners. The site (around 39,000 ha) is situated in one of the last intact forest areas in Lusaka Province and is managed as a 60 km long buffer zone for Lower Zambezi National Park. About 8,300 people live in 28 villages adjacent to the area. The main drivers of deforestation and degradation are charcoal making, subsistence farming and settlement. Working to prevent the emissions of around 6.5 million tCO^2e over 30 years, the project has established 18 community-based deforestation mitigation initiatives', regulated through community agreements, including conservation farming and fruit tree nurseries, designed to create sustainable alternatives to deforestation.

The site is projected to experience temperature increases and more erratic rainfall, with longer dry periods and heavier rainfall events. This could result in crop failures and a return to traditional methods of charcoal making. As part of working towards the Gold Level criterion on adaptation for communities and/or biodiversity under the Climate, Community and Biodiversity Standards[11], the project is working to ensure that its community-based initiatives are resilient to the risks from likely climate change and variability, and that the project activities will assist communities to adapt. This involves directing the farming initiatives towards using minimum tillage crop farming, diversifying livelihoods and incomes to buffer against potential impacts (introducing honey and poultry production), and refurbishing old boreholes for watering tree seedlings during periods of reduced soil moisture. These activities are aligned with the National REDD+ Programme, in so far as they recognise the need for the forest sector to contribute to climate change mitigation, adaptation and human well-being, and for REDD+ to be nested within more integrated approaches that include climate change adaptation. Although this project is managed independently from the National REDD+ Programme, the Programme intends to learn lessons from the implementation of this project.

Main lessons from case study: *It is possible for REDD+ activities to take account of climate change adaptation in a way that will increase the sustainability of REDD+. Examples of actions undertaken by voluntary carbon market projects may help in identifying appropriate adaptation options for a country's overall REDD+ strategy.*

Sources:

Environmental Services Inc. (2013) BioCarbon Partners – Lower Zambezi REDD+ Project Validation Report, 21 June. Environmental Services, Inc, Jacksonville, USA.

Zambia (2010) National REDD+ Programme Document, final version, September, http:/www.unredd.net/index.php/index.php?option=com_docman&task=doc_download&gid=3157&Itemid=53 [accessed 11/11/2014]

[11]Climate, Community and Biodiversity Standards (http://www.climate-standards.org/) are used to evaluate land management projects that aim to reduce greenhouse gas emissions from deforestation and forest degradation, or that remove carbon dioxide by sequestering carbon.

Mindo Nambillo Forest Reserve, Ecuador. © Peter Prokosch 2014.

Supporting forests to adapt to climate change through actions that maintain characteristics of resilient ecosystems can also decrease the risk of the release of carbon dioxide stored in forests as climate change advances. Characteristics of resilient ecosystems are likely to include high diversity, and high degrees of naturalness and intactness[xii]. Actions that support such characteristics include:

- reforestation approaches that result in ecosystems with more natural features such as diverse, mixed-age stands;
- selecting locations that connect to existing areas of natural forest including along climate gradients; and
- using adaptable species or species appropriate for projected climate change for restoration, reforestation and/or afforestation.

By helping to secure ecosystem services important for adaptation, these actions can reduce vulnerability and related pressures for land-use change.

How can REDD+ support climate change adaptation?

Depending on how REDD+ strategies and programmes are structured, **the implementation of REDD+ activities has the potential to maintain and enhance ecosystem services important for adaptation.** For example, REDD+ actions to restore or conserve forests on steep slopes could improve regulation of surface run-off and sediment transfer into rivers helping to manage soil erosion and water quality, recognizing that effectiveness is dependent on many factors including types of forests and soil, density of undergrowth and previous management[xiii]. In coastal areas, conserving mangrove forests can provide a buffer zone against coastal flooding and erosion from extreme events (see Boxes 3 and 4). The most important ecosystem services for adaptation at a given location can be identified through climate change impact, vulnerability and adaptation assessments.

The way REDD+ is implemented can also influence society's adaptive capacity[xiv]. Adaptive capacity is 'the ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences'[xv]. Adaptive capacity at the local level can be influenced by six factors that strongly interact and influence each other. They include:

1. Extent of the asset base (natural, physical, financial, human and social capital[12]) for example level of economic and educational resources;
2. Degree of diversity of the asset base (including diversity within and between different capitals) for example the range of employment opportunities
3. Degree of equitable access to/use of assets and participation in rule making on access and use;
4. State of knowledge and availability of information on climate change impacts and adaptation options;
5. Ability to support new practices and foster innovation; and
6. Presence of flexible forward-looking decision making and governance (ability to anticipate change and incorporate changing information in planning and governance)[xvi].

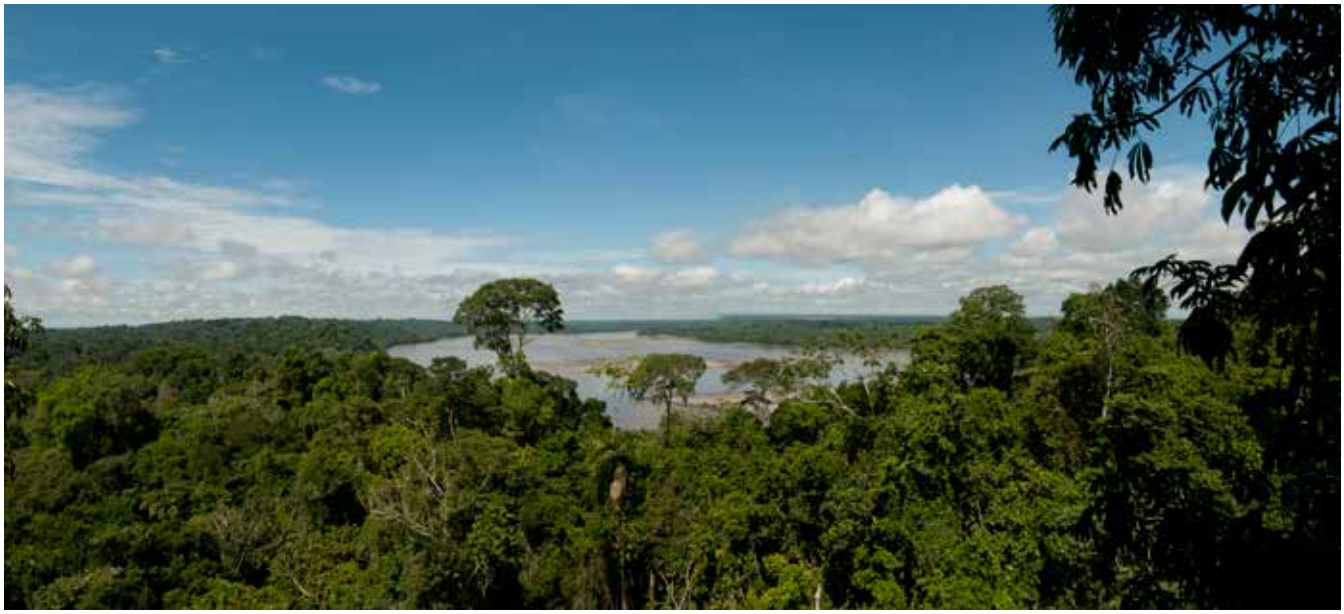
[12]Examples of these different capital sets include: human (skills and knowledge gained through education or training), social (local community groups, family networks), financial (household savings, access to financial loans, livestock and household wealth), physical (dams, flood defense schemes, boreholes), and natural capital (stocks of environmental assets from which ecosystem services flow, e.g. forest cover).

Promoting and supporting Cancun safeguard (e)[13] can help to ensure existing natural capital is maintained, and potentially enhanced. REDD+ actions can also contribute to building other capital types resulting in a diverse asset base (factor 1). For example, REDD+ may build human capital by improving understanding on, and providing tools for, sustainable management of forests, or by providing marketing and product development assistance for non-timber forest products. Such capacity building and knowledge exchange on increasing the sustainability of REDD+ actions may also increase the availability of information on climate change impacts and adaptation options (factor 3). For example, information on climate-resilient tree species could be shared.

REDD+ benefit distribution mechanisms may also enable communities and individuals to acquire assets that support adaptive capacity. For example, direct payments (financial capital, relating to factor 1 above) may enable school fees to be paid, increasing human capital. In-kind payments in the form of food or other goods (particularly applicable in areas where cash is rarely used) can provide other forms of capital. Alternatively, payments to communities may provide reserves that can be used to support recovery following climatic shocks. Ensuring that payment agreements have incorporated sufficient flexibility to allow innovation to changing conditions due to climate change (factor 4) will improve adaptive capacity.

REDD+ may also support equitable access to assets and participation in rule making on access and use (factor 2) as REDD+ readiness activities can clarify rights to land. Complex procedures to gain rights can restrict access and use, and deter forest users from engaging in forest management[xvii]. The establishment of multi-stakeholder/sectoral platforms by REDD+ programmes can support the sharing of experience on how REDD+ work has influenced society's ability to adapt. Experiences of coordinating across multiple sectors related to forest management, and that impact adaptive capacity, could also be shared. Such platforms can support access to up-to-date information and so help enable REDD+ strategies to track and adapt to changing context (related to factor 5).

REDD+ could act as a window of opportunity for reforming the forestry sector (including timber production). If this is the case, then it may provide an opportunity for considering adopting approaches to helping forests adapt to climate change as outlined in this brief.



Yasuni National Park, Ecuador. © Peter Prokosch 2014.

[13]Cancun Safeguard (e). That actions are consistent with the conservation of natural forests and biological diversity, ensuring that the actions referred to in paragraph 70 of this decision are not used for the conversion of natural forests, but are instead used to incentivize the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits; UNFCCC decision 1/CP.16 Appendix 1, paragraph 2(e) http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2

Box 6 – Forest-community vulnerability to climate change – Peruvian Amazon case study

The Peruvian Amazon has already undergone significant climate change. In the Alto Mayo river basin, temperatures have increased by 0.22 °C - 0.48 °C per decade between 1965 and 2005, and river hydrology and flood regimes have altered. The combined effect has been a decrease in yields from cash crops. Future projections show that temperatures could rise 0.5 °C -1.8 °C and annual precipitation could decrease by 10-20% by 2020. This will likely lead to an increase in droughts, forest loss, and increase incidences of extreme events such as flash flooding and forest fires.

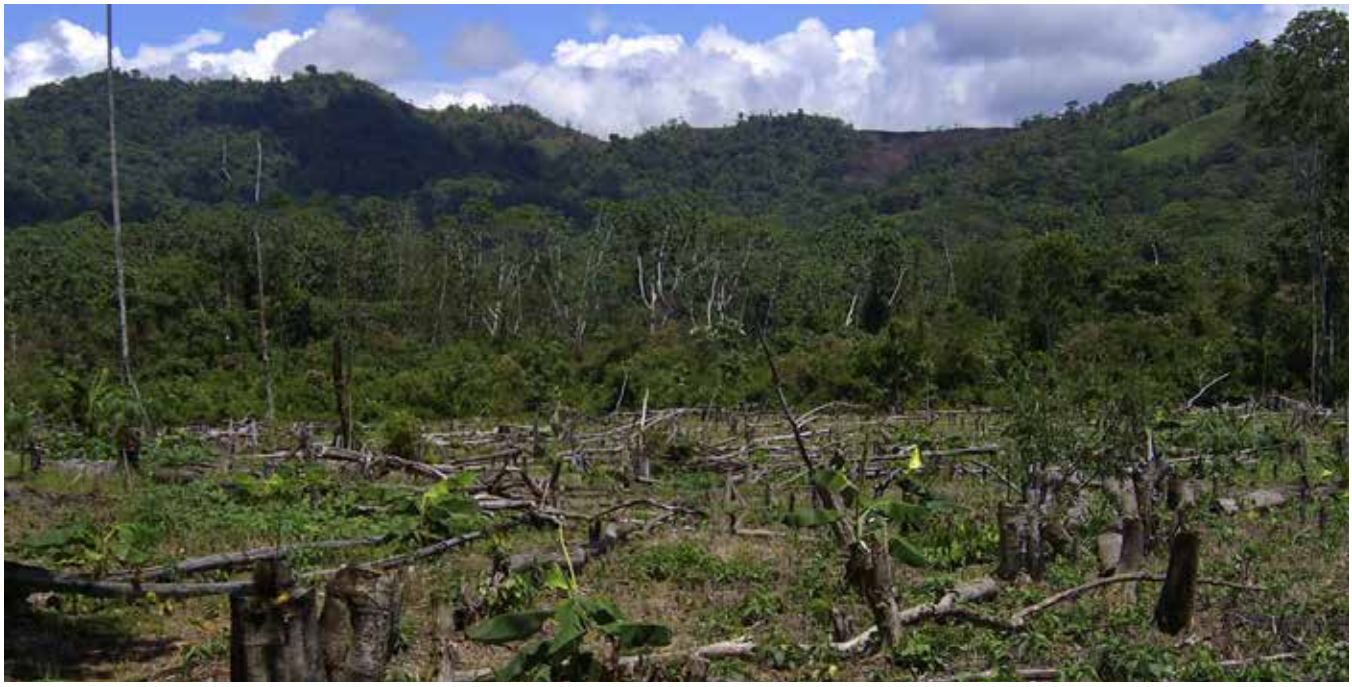
The Indigenous Health Adaptation to Climate Change Project assessed the vulnerability to climate change of two indigenous communities in the Peruvian Amazon; Panaillo and Nuevo Progreso. Through a participatory process, food and water insecurity and vector-borne diseases were observed as the three main types of climate-related health issues to which community members are currently exposed. Deforestation has been found to create extra vulnerability amongst communities to climate-related health issues for the following reasons:

- a reduction in large trees used for shade when working;
- fewer medicinal tree species and, in turn, a loss in traditional ecological knowledge amongst children to enable them to identify tree species with health benefits;
- undermining the adaptive capacity offered by the wild food found in the forests which acts as an alternative food source when crops fail.

Main lesson from case study: *Identifying how communities have been using the forest to tackle climate-related health issues can support the development of safeguards as part of REDD+ readiness activities, including in relation to clarifying land access and use rights.*

Source:

Hofmeijer, I., J. D. Ford, L. Berrang-Ford, C. Zavaleta, C. Carcamo, E. Llanos, C. Carhuaz, V. Edge, S. Lwasa, and D. Namanya (2012) Community vulnerability to the health effects of climate change among indigenous populations in the Peruvian Amazon: a case study from Panaillo and Nuevo Progreso. Mitigation and Adaptation Strategies for Global Change 18(7), 957–978.



Deforestation in the Peruvian Amazon. © Jagubai 2010 (CC BY-NC-ND 2.0). https://flickr.com/photos/jagubal/4297236884/in/photolist-7xJsP7-pp8srn

Challenges and trade-offs

Decision makers and practitioners should take account of a number of potential challenges and trade-offs (compromises that may have to be made) when considering the relationship between REDD+ and adaptation. First, climate change means that the current context for mitigation and adaptation measures is likely to change in the future. For example, deforestation pressures from agricultural expansion may change as suitability of areas for production change. The varying nature of climate change impacts is a challenge for both mitigation and adaptation policy and practice. As another example, mangrove conservation and restoration actions, for mitigation and adaption, need to consider the impacts of rising sea-level within their design[xviii]. Establishing processes to incorporate relevant information as it becomes available (for example on emerging local changes due to climate change), and maintaining flexibility and diversity in approaches as part of adaptive management, can help to overcome this challenge.

Another challenge is that mitigation efforts are driven by the need for global benefits (in terms of reducing greenhouse gas emissions and therefore global climate change), whereas the primary driver for adaptation action is locally specific, as are the benefits. While REDD+ may provide important benefits at local scales (e.g. erosion control and jobs), the differing priorities of local and global stakeholders may need to be reconciled. There can also be additional trade-offs between the objectives of REDD+ and adaptation. Depending on how REDD+ is implemented, local communities' access may be restricted to forests and forest products that are used during times of stress (see Box 6 for examples of how communities rely on forest ecosystem services). Conversely, maintaining un-restricted community access to forest products useful for adaptation (e.g. timber to rebuild homes after extreme events, building materials for retention walls) may prolong high levels of deforestation and degradation and so undermine REDD+ aims. However, if in the long-term REDD+ contributes to a sustainable provision of forest resources, then the impact on adaptive capacity may be positive. In addition, REDD+ actions such as community forestry that allow access to, and management and use of, forest resources by communities can mediate this potential trade-off. **Overall, REDD+ and adaptation actions can be complementary, although it also needs to be noted that REDD+ actions will not be able to achieve all adaptation goals, and adaptation actions will not be able to achieve all REDD+ goals.**

Arecaceae have great economic importance, including coconut products, oils, dates, palm syrup, ivory nuts, carnauba wax, rattan cane, raffia and palm wood. © Peter Prokosch 2014.

Considering the spatial overlap in the forest areas important for different benefits, for example, between priority areas for conserving forest carbon and those for conserving forests for erosion control, can help in identifying both complementarities and trade-offs. Where the same activities can be implemented for both adaptation and mitigation benefits (in this case, conservation of the forest) and there is spatial overlap in priority areas, it can be relatively easy to meet both objectives. However, there can be trade-offs if there is no spatial overlap in the areas important for different goals such that decision-makers are forced to decide between focusing conservation in different locations which provide different benefits[xix]. Decision makers can also be faced with trade-offs if there is spatial overlap but the activities needed to achieve mitigation and adaptation benefits differ.

Further examples of possible trade-offs include the possibility that the most appropriate tree species for supporting adaptation may not necessarily sequester the largest amounts of carbon. Also, large-scale afforestation and reforestation aiming at carbon sequestration can potentially heighten the impact of lengthened dry seasons by reducing surface and ground-water sources[xx]. Careful consideration of species used in, and the location of, afforestation and restoration actions, together with information on climate change impacts and vulnerabilities (at the most local scale possible), can help to address these issues.

Furthermore, both mitigation and adaptation policies carry the potential for some measures to have unintended consequences. Examples range from the risk of REDD+ actions causing displacement of deforestation pressures to other areas, to adaptation measures, especially hard adaptation such as sea walls and dams, posing a risk to forest ecosystem services that are important for adaptation. Carefully considering the possible impacts actions may have on mitigation, adaptation and ecosystem services objectives can help identify issues which safeguards could address. Considering the wide range of impacts when developing and implementing safeguards (including the Cancun safeguards for REDD+) can help to ameliorate potential risks and enhance potential benefits.

A common challenge for both REDD+ and adaptation is the need to work across sectors. For REDD+, this is an imperative in order to address the drivers of deforestation and forest degradation, to mobilize funding, and to be integrated into economic strategies. For adaptation, the large range of sectors that may be impacted by climate change and that may have activities that impact upon adaptation options means that coordination across sectors is essential. Establishing multi-sectoral coordination units/teams will be important for successful REDD+ and adaptation planning, and will provide platforms to discuss links between mitigation and adaptation actions. Initiatives such as Indonesia's REDD+ One Map Initiative, that aims to develop a map that contains all relevant information linked to forest licensing and land use claims and that is agreed to by all line ministries, can help increase co-ordination and reduce conflict. **Integrating both adaptation and mitigation into wider forest policy and the strategies and plans of related sectors at the local to national scales can help maximize synergies and minimize trade-offs.**

Raw sago, used mainly for nutrition but also for textile production. © CIFOR 2010 (CC BY-NC-ND 2.0). https://flickr.com/photos/cifor/6901017374/in/photostream/

Finally, **the number of examples of joint REDD+ (and mitigation generally) and adaptation programmes and projects is still relatively limited.** The reasons for this vary but include the current separation between adaptation and mitigation policies and funds, and the cost of monitoring both themes[xxi]. This challenge can be overcome by developing practical guidance, and making it available, to support those interested in undertaking joint REDD+ and adaptation work, including on adapting sustainable management of forests to climate change. Documenting more national-level case studies can provide further evidence on the benefits of implementing joint actions. Such evidence may influence donors to provide support for, and amend funding processes to be more conducive to, building greater complementarities in REDD+ and adaptation work.

Options for enhancing the linkages between REDD+ and adaptation

An important step towards realising opportunities and addressing the challenges presented in this brief, is for **REDD+ and adaptation strategies, plans and programmes to explicitly acknowledge complementarities**[14]. This may promote and facilitate coordination between REDD+ and adaptation focal points, implementing agencies and practitioners. It can also enhance the consideration of climate change adaptation needs when developing country approaches to the REDD+ safeguards, and of REDD+ needs when developing social and environmental safeguards for adaptation actions.

Deliberate efforts should be made by REDD+ and adaptation practitioners to share relevant information between REDD+ and adaptation processes, thereby possibly reducing the costs of respective information gathering efforts. For example, climate change impact and vulnerability assessments for adaptation projects may consider the impact of climate change on forests or forest ecosystem services. This, together with any maps produced to identify where communities or species are particularly vulnerable, would help to ensure that REDD+ supports adaptation. Vulnerability assessments may also provide useful baseline information for assessing social benefits in the context of REDD+ safeguards and safeguard information systems. Furthermore, information on the effectiveness of adaptation options collected by and disseminated from monitoring and evaluation systems related to policies, projects or programmes, can support both future adaptation projects and REDD+ projects aiming to have adaptation benefits.

From the REDD+ side, safeguard information systems will collect information that, depending on the scale, may be relevant for adaptation planning. For example, information on the social benefits of REDD+ interventions could be useful for assessing vulnerability to climate change impacts. Information on forest type, location and carbon stocks collected through National Forest Monitoring Systems, may also be useful for those planning forest-based EBA interventions. Assessments of ecosystem services and their value are useful for both REDD+ and adaptation efforts to enable more balanced assessment of the costs and benefits of different options. Advances in valuation methodologies and results of their application could be exchanged to the benefit of both REDD+ and adaptation.

Adaptation and REDD+ are often addressed through different processes, discussed in parallel policy debates that are often not linked, led by different ministries or institutions, and involve different constituencies and funding sources[xxii]. **More efforts should be made by national forums and regional initiatives to bring adaptation and REDD+ practitioners together to share information and experience**; for example through joint initiatives to develop maps that highlight forests important for adaptation and REDD+, as part of integrated landscape-scale spatial planning. Capturing and disseminating the outcomes of such joint initiatives may inspire further actions to enhance the linkages between REDD+ and adaptation. Currently there are a limited number of joint REDD+ and adaptation programmes and projects, however REDD+ and adaptation actions are advancing at such rapid rates that there will be an increasing number of opportunities to implement both sets of actions in a complementary manner.

[14]In particular with National REDD+ Strategies and National Adaptation Planning (NAP). The NAP process under the UNFCCC encourages countries, currently focusing on Least Developed Countries (LDCs), to build upon National Adaptation Programmes of Action (NAPAs), which highlighted immediate adaptation action priorities for LDCs, and other individual adaptation experiences, to develop medium- and long-term planning for adaptation. Pramova et al. (2012) found that forest and woodlands were the most-often cited providers of ecosystem services in NAPAs (Pramova, E., B. Locatelli, M. Brockhaus and S. Fohlmeister (2012) Ecosystem services in the National Adaptation Programmes of Action. Climate Policy 12, 393-409). Considering the role of ecosystem services provided by forests to help people and sectors adapt to climate change impacts is therefore likely to be integrated into NAPs. This may present opportunities for linking to REDD+ processes.

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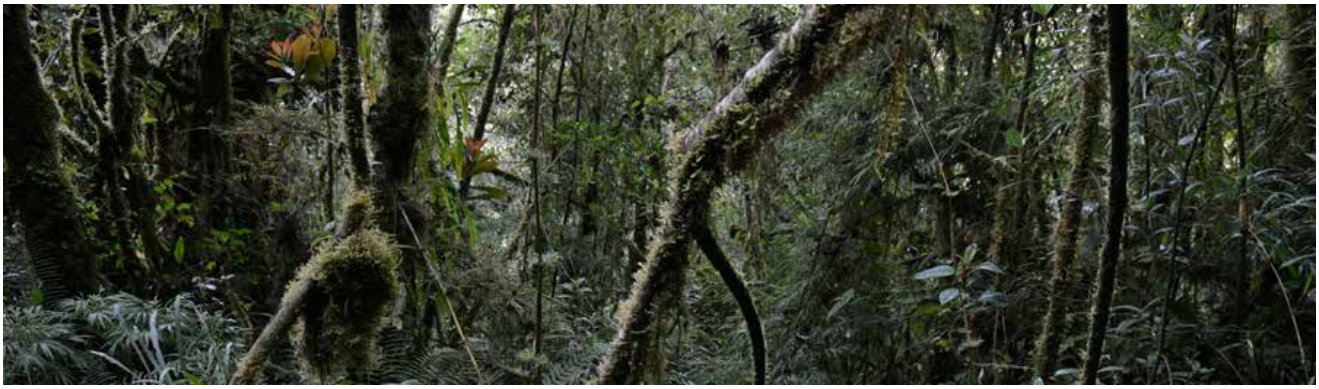

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Acknowledgements

The authors gratefully acknowledge comments and inputs provided by: Valerie Kapos, Lera Miles, Stephen Woroniecki, Elina Väänänen, Ralph Blaney (UNEP-WCMC); Thomas Enters and Keith Alverson (UNEP); Adam Gerrand (FAO); Joel Scriven (UNDP); Bruno Locatelli (CIFOR); Analiza Rebuelta-Teh (Department of Environment and Natural Resources, Philippines); Biodiversity Management Bureau and Forest Management Bureau, Philippines; Eliki Senivasa (Ministry of Fisheries and Forests, Fiji); Eleni Tokaduadua (Department of Environment, Fiji); Ignatius Makumba and Deuteronomy Kasaro (Forestry Department, Zambia); Hassan Sachedina (BioCarbon Partners); and Gustavo Suárez de Freitas Calmet (Ministry of Environment, Peru).

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