

CIFOR Contribution to NWP Synthesis Report

Preamble

Climate change is affecting every aspect of human and natural systems that inherently have different sensitivities and adaptive capacities to cope with the severity of the impacts. CIFOR therefore believe that the pattern and determinants of vulnerability to climate change and the effects on the coupled human- environment systems are constantly changing and generating inequality in the impacts on the people and their natural resource-base.

Ecosystems are considered as capital assets which under proper stewardship yield the flow of multiple goods and services shared by many for their wellbeing and national development. However, they are undergoing large scale changes through expanding human population and livelihood activities, economic growth and changes in consumption patterns affecting both their integrity and resilience to climate impacts. Dealing with these changes require planning whereby attentions are paid to the most vulnerable systems and people in the process of balancing the needs of multiple stakeholders under climate change.

In line with the Nairobi Work Programme, CIFOR focuses its activities on the **development issues¹ of regional/national priority** and for which forests play a substantial role for adaptation.

CIFOR uses ecosystem-based approach to adaptation by planning and developing adaptation strategies using ecosystem services in participatory actions with the community. By placing ecosystems e.g. forest ecosystem within the context of household livelihood and national development the ecosystem-based approach to adaptation has general applicability and implications for poverty, food security, and rural energy security and also addresses environmental degradation that constitutes a major source of vulnerability. Furthermore, the approach allows regional planning for adaptation for transboundary ecosystems shared by several nations such as forests, river catchments, and watersheds etc. The participatory approach used in setting the agenda and planning the implementation of the activities together with the stakeholders contributes in promoting knowledge sharing and learning activities as emphasized by NWP. The engagement of stakeholders from the on-set, prepares their participation in future knowledge-sharing platforms and policy dialogue processes in developing adaptation strategies around a common priority.

¹ Development issues can include national development objectives, policies or broader interests linked to the process of development in a country. They could include processes for, or threats to, development on sectors or goals for which forest goods and services play a significant role.

CIFOR Pledges to the Nairobi Work Programme falls under two sub-themes

- **SUB-THEME A: IMPACTS AND VULNERABILITY**

- i. Promoting development and dissemination of methodologies and tools for impact and vulnerability assessments, such as rapid assessments and bottom-up approaches as they apply to sustainable development;
- ii. (iv) Promoting understanding of impacts of, and vulnerability to, climate change, current and future climate variability and extreme events, and the implications for sustainable development;
- iii. (v) Promoting the availability of information on the socio-economic aspects of climate change and improving the integration of socio-economic information into impact and vulnerability assessments

- **SUB-THEME B: ADAPTATION PLANNING MEASURES AND ACTIONS**

- i. Promoting the development and dissemination of methods and tools for assessment and improvement of adaptation planning, measures and actions, and integration with sustainable development;
- ii. Collecting, analyzing and disseminating information on past and current practical adaptation actions and measures, including adaptation projects, short- and long-term adaptation strategies, and local and indigenous knowledge;
- iii. Promoting research on adaptation options and the development and diffusion of technologies, know-how and practices for adaptation, particularly addressing identified adaptation priorities and building on lessons learned from current adaptation projects and strategies;
- iv. Facilitating communication and cooperation among and between Parties and relevant organizations, business, civil society and decision makers, and other stakeholders;
- v. Promoting understanding and the development and dissemination of measures, methodologies and tools including for economic diversification aimed at increasing economic resilience and reducing reliance on vulnerable economic sectors, especially for relevant categories of countries listed in Article 4, paragraph 8, of the Convention.

In the context of this synthesis publication, the emphasis here is on “Assessing climate risks and vulnerability” and “Promoting knowledge sharing and learning”.

1. Outcomes and impacts of actions

a) Assessing climate risk and vulnerability

CIFOR climate change activities in Indonesia and West Africa are used to illustrate climate risks and vulnerability assessments under different contextual situations and use of forests. We assessed the vulnerability of coupled social-ecological system from three composite indicators or principles (Fig. 1). The first deals with the vulnerability of ecosystem services to climate change and other drivers of change. The second relates to the sensitivity of society to the loss of relevant ecosystem services while the third is the adaptive capacity of the system as a whole, referring to the capacity of the social systems to reduce the loss of ecosystem services. These three principles cover the biophysical vulnerability, social vulnerability and adaptive management. With this assessment method, we considered social development that reduces the vulnerability to current climate variability would help to increase the resilience of the society to projected climate change.

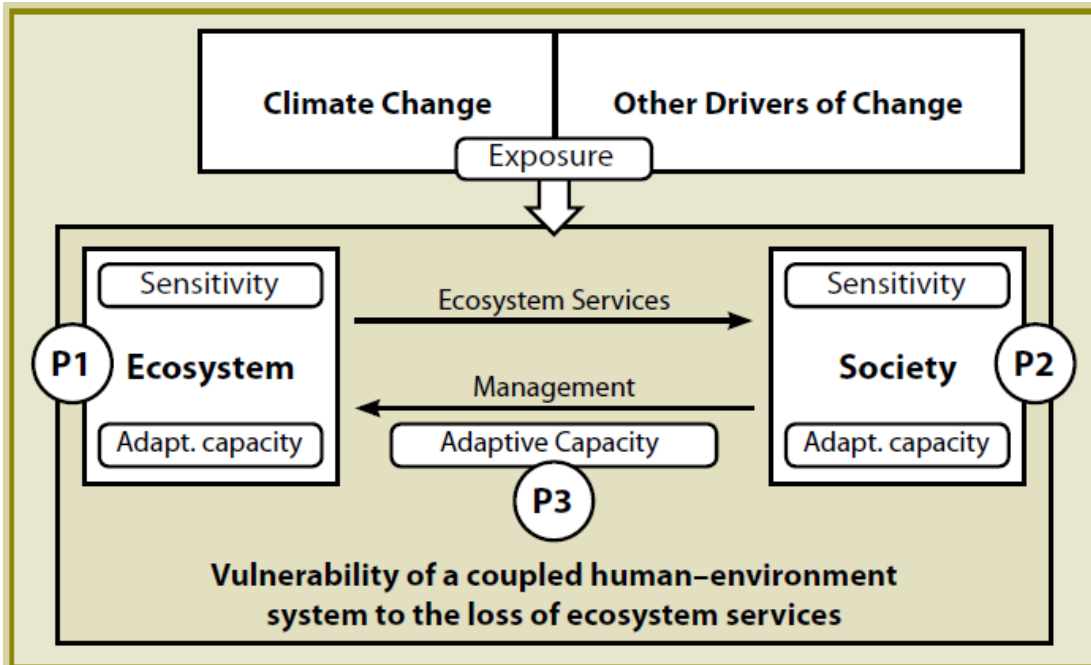


Fig. 1: Principles or composite indicators for vulnerability assessment of coupled human-environment system (social-ecological system): P1 deals with vulnerability of ecosystem services to climate change or variability and other threats, P2 deals vulnerability of society to the loss of goods and service, P3 deals the adaptive capacity of the system as a whole, referring to the capacity of the human systems to reduce the loss of ecosystem services.

In Indonesia, we assessed two prioritized issues of climate relevant risks in the forest ecosystem: vegetation fires and landslides. We conducted climate risk assessment as part of the vulnerability assessment to understand the potential impacts of climate change on ecosystem regulating services that could, for examples, affect the frequency and potential intensity of fires, and landslide frequencies and landslide risk zones. We used downscaled climate scenarios generated from PRECIS regional climate model (<http://precis.metoffice.com/>) to assess climate risks of fire and landslides. We plotted projected modified Keetch and Byram Drought Index (KBDI) from climate scenario to assess the potential risk of fire in selected areas in Indonesia. This dryness index is commonly used in fire danger rating system. We also assessed the projected frequency and duration of heavy rainfall to estimate the future risk of landslide and the change in the landslide risk zone using downscaled climate scenarios and an impact model. This assessment falls under principle one, that is the vulnerability of the ecosystem service to climate change. The main purpose of this risk assessment is to communicate the projected climate change impacts for awareness rising as a starting point of adaptation planning.

We conducted another test of vulnerability assessment on a Javan Rhino conservation zone that was under threat from expansion of human activities to the conservation zone. From a group discussion with relevant stakeholders and experts, we found that a clear local government's vision on the existing conservation zone was critical. Government's support for the poor in the surrounding zone was necessary. We also found that we did not know the sensitivity of the rhinos directly to climate stress.

Following the participatory approach we used for the implementation of all the activities, the vulnerability assessments in West Africa represent examples of shared knowledge and experiences of climate risks as testified by communities. Some of these observations by the community clearly match those obtained from analyses of meteorological data and simulations by PRECIS model of future temperature changes. For example, the average annual temperature of Burkina Faso is likely to increase by between 3.88°C and 4.46 °C; Ghana 2.48°C and 4.22 °C; and Mali 4.3- 4.86°C by the end of the 21st century, relative to 1961-1990. Annual rainfall are projected to: (1) increase by 6% to 22% over the whole of Burkina Faso, (2) decrease by 1% to 20% over Mali, except over the south-east part, (3) increase by 8% to 53% over the whole of the east part of Ghana, except at Ho and decrease by 7% to 12% over the whole of the west part of Ghana, by the end of the 21st century, relative to 1961-1990. Decrease amount of rainfall with lower discharge of rivers and water availability for rain-fed agriculture. There are prolonged dry periods that reduce soil moisture, causes crop failure, drying up of wells and boreholes, and poor water quality. The rainfall pattern has become erratic leaving farmers unable to plan their planting activities. The frequencies of storms/floods have increased destroying farms and property. Increasing air temperature leads to more frequent diseases such as malaria and skin debilitations, and causes crops to ripe prematurely. There are longer durations and increasing intensity of sunshine that causes wilting and drying of crops and enhanced forest fires.

We mapped changes that threaten Ghana's forests and savannah woodlands in assessment of vulnerability of the natural resource-bases of communities. The closed forest reduced from 2,736 km² to 1,623 km² between 1985 and 2000 at an annual rate of 1.6%, leaving mainly gazetted forest reserves in 2000 and would reduce to 871 km² in 2050 Savanna woodland decreased from 1,195 km² to 340 km² between 1985 and 2000. According to projections the area will further decrease to 126 km² in 2050, at an annual rate of 1.5%. In the forest savannah transition zone, open forest were degraded by 85% at an annual rate of 1.0% and closed savannah woodland were degraded by 35.5% at an annual rate of 0.7%. They are expected to decrease further by 1.2% and 17.8% respectively. We found out that between 2000 and 2050, the surface of 74% of the savannah, 77% of the high forest and 38% of the forest savannah transition zone represent hotspots of forest degradation. Similarly, between 2000 and 2050, the surface of 76% of the savannah, 56% of the high forest and 29% of the forest savannah transition zone represent areas of high vulnerability to forest degradation.

We conducted research in some local communities in northern Burkina Faso that indicated significant reduction in the availability of some NWFP species and high variability in their productivity. We found out working with local communities in Ghana in their use of local knowledge for adaptation found that individuals' or communities' ability to cope with a situation depends on several factors with the baseline being the resources at their disposition. In managing scarcity of water resources some communities and individuals are digging wells to provide water during the dry season. But in most cases, scarcity of water has forced most households to change their habits and become very careful with its use.

b) Promoting knowledge sharing and learning

From the vulnerability assessments in Indonesia, we identified many initiatives in line with adaptation that could reduce the climate vulnerability in the context of vegetation fires, but there were also many that needed to be put in place. Those already taking place mostly addressed land protection and enhancement, governance and adaptive management. There were others relevant to adaptive management, such as Sustainable Forest Management, controlling illegal logging, fire management, community based fire management, peatland rehabilitation, etc. Unfortunately, these initiatives are disintegrated, uncoordinated, and unbalance in scale. Underlying causes such as poverty and land tenure conflict, and other social-and-government system such as policies that are difficult to implement and weak law enforcement were not yet well addressed. We encouraged integrating and synergizing those existing initiatives and at the same time to scale up some local initiatives that successfully managed fires, rehabilitating peatland, reducing social issues that cause conflicts, and reduces poverty.

Higher rainfall intensity and more frequent heavy rainfall increase the risk of landslides. Through community group discussions, we identified the need to integrate landslide adaptive land management with Community Based Disaster Risk Reduction (CBDRR) program in a landslide risk zone. Land management should consider land use/cover and trees variety. CBDRR program needs to be enhanced through education that includes awareness, evacuation planning and relief effort planning. These efforts were mainly to reduce the speed of the slide and to reduce number of lives lost in the case of landslides occur.

2. *Emerging good practices and lessons learned*

The identification and prioritization of the development sectors for adaptation occurred at two levels; national and regional levels. This represents a consensus among the multiple stakeholders and voluntary trade-offs of their special interests and positions for a common interest with the aim of achieving adaptation for all. By sharing the responsibilities and the burden of climate change prioritization seemingly allows for the re-distribution of the risks across different social/economic groups such that climate impacts is not too severe on the most vulnerable since their unique situation is captured by the prioritization process.

The process of testing the methodology, identifying and screening the adaptation options are undertaken through the multi-stakeholders participatory approach used for the implementation of the planned activities.

Following stakeholders' prioritization of forest-based sectors, the identification and selection of adaptation options is based on specific methodologies were developed for the assessment of vulnerability for each of the topics selected by the region. As a coupled human-environment system, the assessments of vulnerability involve criteria and indicators characterising all aspects of the coupled human-environment system. This is important because TroFCCA's ecosystem approach to adaptation is only possible by emphasising the linkages between livelihood and the forest ecosystem using ecosystem services to enable the development of policy-related adaptation strategies across different levels (local, national and regional) and institutions. That also makes it possible to approach the planning of adaptation from a wide range of inter-related issues such as:

- 1) Impact of climate change on the forests and the effects on the provisioning of ecosystem services
- 2) Impact of climate change on livelihood and the effects on the use or consumption patterns of ecosystem services
- 3) The corresponding change in behaviour, consumption or provision patterns in response to climate change impacts
- 4) The resilience in the system in the face of all these.

The main lesson learnt from the vulnerability assessments in Indonesia, was the dire need to communicate climate risk and vulnerability of ecosystem services and societies dependent on these services. Group discussions with relevant stakeholders and experts based on those three principles could identify relevant solutions, and what improvement needed that potentially reduces the vulnerability. The vulnerability assessment in Indonesia was meant to mainly aid in communicating vulnerability to policy, collectively identifying the potential sources of vulnerability and the options to address them in participation with the stakeholders, instead of simply comparative analysis.

Supporting national governments and partners

The great collaboration and partnership also enabled knowledge exchange, collection of scientific and policy data crucial for the analyses of key areas of project objectives. Project visibility through these participatory activities resulted in frequent requests for information by national and regional partners seeking advice for the development of new adaptation projects and activities.

This is an analysis of first results of a case study on forests, climate change and aspects of adaptive capacity under a Following the changing institutional landscape.

The project's objective of mainstreaming adaptation into national policies, involves continuously engaging national and regional policy makers in promoting the role of forest for adaptation and for the integration of climate change adaptation into development planning. The high points of progress in this regard include the fact that the project have in turn, been engaged by national government and regional organizations in Africa to contribute to the elaboration of policy related documents. For example:

National level

- 1) The government of Burkina Faso through SP-CONEDD (Secrétariat Permanent du Conseil National pour l'Environnement et le Développement Durable), invited TroFCCA to contribute to their national environmental document on issues of adaptation.

Sub-regional Level

1. l'Union Economique et Monetaire Ouest Africaine (UEMOA) requested for contribution to their Environment and Natural Resource Management document.
2. The Economic Commission of West African States (ECOWAS) requested for contribution on forests and climate change adaptation to the ECOWAS Forestry Policy.

Regional

1. Invitation to contribute to the ‘Scoping Paper for Expert Group Meeting on Climate Change Adaptation’ presented to the African Ministerial Conference on the Environment (AMCE) 7-9 June 2008, Johannesburg, South Africa.
2. Invited contribution to the African Group preparatory meeting prior to the 3rd Session of the Ad hoc working group on Long Term Cooperation Actions under the UNFCCC. 18TH August 2008, Ghana.
3. TroFCCA-CIFOR was recently selected as one of the host institutions for the African Climate Change Adaptation Fellowship program coordinated by START and the African Academy of Science.

These cases are indications of the recognition and acceptability of the project’s message in the region constituting important steps of mainstreaming and effecting policy change.

3. Emerging opportunities, challenges and further needs

There are emerging opportunities following the implementation of the projects as public and policy awareness is increasing. Collaboration and partnerships at local, national and regional levels has increased facilitating the harnessing of inputs for the methodology for vulnerability assessment, policy analysis and for the establishment of exchange platforms at the local level to connect actors implicated in decision making for the management of Forest Goods and Services (FEGS) linking local and national levels. There are great opportunities to enhance the successful implementation of NAPA projects in West Africa following their recognition of the role of Forest Ecosystem Goods and Services (FEGS) as clearly recognised in their NAPAs (Table 1). The NAPA of Burkina Faso cites four sectors—water, agriculture, livestock and forestry/biodiversity—as the most vulnerable to climate variability and change. These four sectors are interlinked and they directly or indirectly depend on goods and services provided by forest ecosystems.

Table 1. Distribution of NAPA priority projects of countries in the West African region

Sectors representing identified priority projects	Country and number of priority projects					
	<i>Benin</i>	<i>Burkina Faso</i>	<i>Liberia</i>	<i>Niger</i>	<i>Mali</i>	<i>Sudan</i>
Cross-sectoral	1	-	-	-	1	3
Food Security	-	5	1	8	7	1
Health	1	-	-	1	1	-
Infrastructure	-	-	-	-	-	-
Early warning and disaster management	-	1	1	1	-	-
Education and capacity building	1	-	-	1	2	-
Terrestrial ecosystems	-	3	-	2	2	1
Energy	-	1	-	-	3	-
Water resources	1	2	-	1	2	-
Tourism	-	-	-	-	-	-
Insurance	-	-	-	-	-	-
Coastal/Marine ecosystems	1	-	1	-	-	-

(Source; Adapted from UNFCCC, 2008)

There are some challenges encountered that need further research. Communities without previous climate studies and benchmark indicators find assessment of sensitivity to climate change difficult. Culturally, some communities are reluctant in answering certain questions, for example sources of income, income levels and other questions directed to their wealth. This in turn, affects the effectiveness of using shared experiences in the assessment. There is usually very little or no literature on climate studies on very rural areas. Where there is little published data on areas with similar conditions, accessibility to the relevant publications is difficult. Finding the right experts with the requisite experience in the field for their inputs and their willingness to assist is a major challenge.