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Forestry in national adaptation plans (NAPs) to climate change

Alexandre Meybeck¹, Vincent Gitz¹, Julia Wolf², Theresa Wong²

¹Center For International Forestry Research (CIFOR)/Forest Trees and Agroforestry (FTA), v.gitz@cgiar.org, a.meybeck@cgiar.org

²Food and Agriculture Organization (FAO) Julia Julia.Wolf@fao.org; Theresa.Wong@fao.org

Abstract

Climate change discussions about forests have for a long time focused largely on their mitigation potential. However, the mitigation potential of forests itself depends on their capacity to adapt to a changing climate and increased human pressure. Forests and trees also play a crucial role in the resilience of landscapes and people and their capacities to adapt to climate change. The National Adaptation Plan (NAP) process offers an opportunity to better integrate these functions in national strategies and policies. The NAP process was established under the United Nations Framework Convention on Climate Change (UNFCCC) in 2010 for least developed and other developing countries to identify and address their medium- and long-term adaptation needs. The Food and Agriculture Organization (FAO) and the Forests, Trees and Agroforestry (FTA) research program of the CGIAR are collaborating to support countries in this regard. Most developing countries had initiated the NAP process and to date 20 countries have shared their NAP. These plans are increasingly linked by countries to the implementation of the adaptation component of their nationally determined contribution (NDC) and used by international funds like the Green Climate Fund (GCF) as well as by international cooperation agencies to orient their funding decisions. The objective of this paper is to give some preliminary insights on how forests, trees and agroforestry are considered in published NAPs, draw lessons and propose recommendations to improve the integration of forestry in adaptation planning processes. It considers the main vulnerabilities of forests and trees to climate change, the adaptation options under consideration, and how forestry is integrated in institutional processes, including the integration of forests and trees into agricultural and other sectoral adaptation measures. It concludes with recommendations to improve integration of forests and trees in adaptation planning.

Keywords: climate change, adaptation, forestry, agroforestry, national adaptation plan

Introduction

The Paris agreement has profoundly changed the way climate action is determined, putting the focus on the NDCs, on national action, priorities and specificities, involving all countries, and increasingly actors other than governments. It recognizes the importance of land use for the achievement of its goals. With the Paris agreement and the nationally determined commitments (NDCs) there is also a better

recognition of synergies and trade-offs between mitigation and adaptation as well as of synergies with sustainable development, opening up additional ways to better integrate land use in climate action.

The national adaptation plan (NAP) process was established under the United Nations Framework Convention on Climate Change (UNFCCC) as part of the Cancun Adaptation framework in 2010 at COP 16. Least developed and other developing countries prepare national adaptation plans (NAPs) that identify medium- and long-term adaptation needs and address those needs. The objectives of the NAP process as described in decision 5/CP.17 are:

- a) To reduce vulnerability to the impacts of climate change, by building adaptive capacity and resilience;
- b) To facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.

Most developing countries are in the process of preparing their NAP. Many developed countries have also prepared adaptation plans. In their new or updated NDCs many countries described the status of their NAP process, showing the NAP as the main national instrument for adaptation and a key source of information for the NDCs (UNFCCC 2021; Crumpler et al. 2021). The NAP is increasingly becoming the way to implement the adaptation component of the NDC.

Approach

This paper is the result of a preliminary analysis conducted by the CGIAR research program on forests, trees and agroforestry (FTA)¹ and FAO as part of their collaboration to support countries in the integration of forests, trees and agroforestry in their national adaptation processes. Developing countries are in the process of preparing their NAP and twenty of them had already transmitted their NAP to the UNFCCC secretariat by December 2020. In addition, numerous other countries have prepared adaptation plans. Available documents allow to draw preliminary findings on the process, the different approaches taken by countries, including how the plan links with other strategies and plans, how it is prepared, the way it is organized by sector, or regions, and how forestry is represented. We analyzed the national adaptation plans submitted in English, French or Spanish on NAP Central², the dedicated UNFCCC website by December 2020. Of these 20 NAPs, half are from Latin America and the Caraibes: Brazil, Chile, Colombia, Grenada, Guatemala, Paraguay, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Uruguay; 6 from Africa: Burkina Faso, Cameroon, Ethiopia, Kenya, Sudan, Togo; 3 from Asia and the Pacific: Fiji, Kiribati, Sri Lanka and one from the Near East and North Africa: State of Palestine. As such, the plans included in this study do not represent a sample of the population but rather constitute a population of submitted plans.

The form, length and structure of national adaptation plans vary by country, with different emphasis on broad orientations and objectives or on specific actions. The present analysis does not attempt to compare NAPs but rather to look in them how they consider forests, trees and agroforestry and to identify relevant features and measures that are relevant for forestry and agroforestry. It was conducted by combination of structural analysis, word search and qualitative content analysis of the published documents. It was complemented by information collected as part of the Integrating Agriculture in National Adaptation Plans (NAP-Ag) programme³, coordinated by the United Nations Development Programme (UNDP) and the Food and Agriculture Organization of the United Nations (FAO). This program aims to address climate change adaptation concerns related to the agriculture sectors in existing national planning and budgeting processes of 11 developing countries: Colombia,

¹ <https://www.foreststreesagroforestry.org/>

² <https://www4.unfccc.int/sites/NAPC/Pages/national-adaptation-plans.aspx>

³ <http://www.fao.org/in-action/naps/overview/en/>

Gambia, Guatemala, Nepal, Kenya, the Philippines, Thailand, Uganda, Uruguay, Viet Nam and Zambia. It allowed to draw lessons both on technical issues and on the preparation of NAPs, especially on institutional and organizational matters, including for instance on the links with the NDC in Vietnam (Rivoal and Viet Hien. 2019).

Results

This section successively considers the way forests and trees are integrated in the institutional process, the main vulnerabilities identified for forests and trees and the measures aimed at their adaptation, and how agriculture and other sectors integrate forests and trees for their own adaptation.

Integration of the forestry sector in the institutional process

Most of the NAPs are organized by sectors, generally chosen because of their particular vulnerability to climate change and/or their role for the overall adaptation of the country, with in addition a cross cutting section. The sectors and their precise delineation generally correspond to specific line ministries to facilitate preparation and implementation of the plan. Forests are often included in the biodiversity/ecosystem sector of the NAP, as in many countries it is the ministry of environment that is responsible for forestry. For Chile for instance, forests are included in biodiversity, except for planted forests that are part of the sylvoagropastoral plan. By contrast, in most adaptation plans of developed countries there is a specific section on forestry, covering all types and functions of forests. In most NAPs, agroforestry is covered in the agriculture section of NAPs. Some NAPs are organized by subnational areas. In addition, most NAPs integrate the possibility of having actions that are subnational.

Adaptation of forests and trees

The main risks identified for forests and trees in the NAPs are increased climate variability, increased heat and drought, increased risk of extreme events, salinity in coastal areas, forest fires, pests and invasive species. In Uruguay, as part of the NAP process, were held adaptation dialogues to identify vulnerabilities and adaptation options. The Forestry Adaptation Dialogue was held with the support of the Uruguayan Association of Forestry Producers (Sociedad de productores forestales). The Dialogue analysed the risks and vulnerabilities associated with different climate events, such as the rise of drought conditions, increased temperatures that can result in an increase in plant diseases and pests, production losses, and increased fire risk. Another key risk identified was the excess of water due to abundant rainfall that can cause a combination of economic and productive knock-on effects. Production losses were also identified as being a potential result of plant health problems, soil erosion and logistical difficulties for harvest that may result in a loss of timber quality. It was agreed that global warming and the projections for the increased intensity of weather events in Uruguay would lead to an increase in the risk factors mentioned. For the preparation of Uruguay's NAP were also examined the synergies between trees and other systems, including the importance of trees for livestock, providing shade in summer and shelter in winter. In each sector a vulnerability assessment was conducted with the stakeholders. They have shown that when the vulnerability assessment is conducted with the stakeholders things emerge that were not apparent from the desk study (Meybeck *et al.* 2020).

As mentioned above, in most cases, natural forests are covered in the biodiversity section of NAPs. The measures promoted generally focus on ecosystem and biodiversity conservation through knowledge generation and sustainable forest management (SFM). They include the development of

monitoring and risk management systems, to identify changes in ecosystems and to monitor, prevent and manage forest fires as well as pests and diseases. There is also a strong focus on research on ecosystems, including biological indicators of stress and modeling effects of climate change on ecosystems, on species of interest (commercial, threatened, invasive). Management measures include SFM, restoration, ecosystem based adaptation, ensuring connectivity and maintaining forests in good health.

The main measures promoted for adaptation of planted forests are related to sustainable forest management, monitoring and risk management systems for forest fires, pests and diseases, and management of genetic resources. For instance, in Chile is planned a monitoring system for pests and diseases covering both crops and planted forests. A range of measures rely on conservation and sustainable management of genetic resources to anticipate future changes. They include changes of planted species and varieties and planting seeds from hotter or drier areas to get adult trees more adapted to the future climate.

Sri Lanka’s NAP identifies adaptation options for export (plantation) crops (tea, rubber, coconut, spices, cashew, sugar canne): germplasm improvement, improvement of farm and nursery management practices, research to assess climate impacts, monitoring and surveillance of pests and diseases, sectoral capacity development. It contains for instance, articulated measures for rubber informed by the research of the Rubber Research Institute of Sri Lanka that was associated to the preparation of the NAP (Wijesuriya 2020), showing the importance of good involvement of scientists.

Forests and trees for adaptation

Countries have identified for the adaptation component of their NDC vulnerable sectors and areas (UNFCCC, 2015). Of particular concern are agriculture and other aspects of food security, water, biodiversity and ecosystems, health systems, infrastructure (in particular energy, transportation and tourism) and loss of territory, livelihoods and habitats (UNFCCC, 2021). As shown in figure 1 most of these sectors are linked to forests, trees and agroforestry, physically or economically.

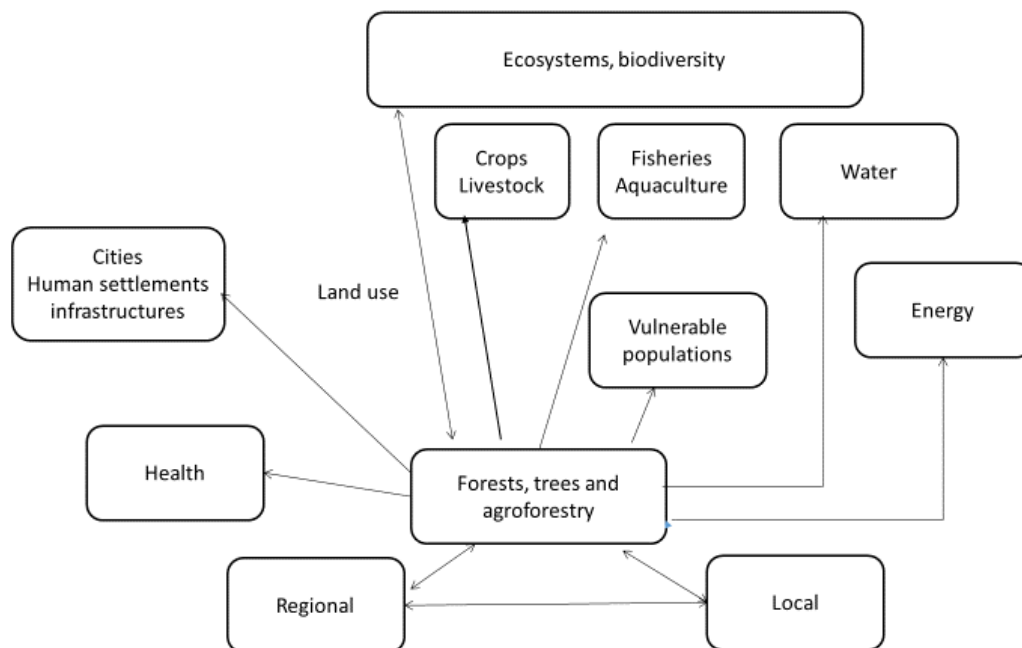


Figure 1: Potential contributions of forests, trees and agroforestry to the adaptation of other sectors Source: Meybeck *et al.* 2020

The arrows represent physical, biological and/or economic contributions. Each sector can also be considered as a system, with its own actors and institutions. As summarized in the figure these sectors generally correspond to the perimeters of line ministries, to which regional and local institutions should be added and can be either emanations of national administrations or of local governments, depending on the countries. In the organizational reading of the figure, the arrows represent links to be constructed between sectors, actors and institutions, as part of the NAP, to strengthen potential contributions of forests, trees and agroforestry to the adaptation of other sectors and ultimately of the whole country.

Forests and trees provide ecosystem services that can contribute to reducing the vulnerability and increase resilience to climate change at different scales: field, farm, household, local communities to national, regional and global levels (Locatelli et al., 2008; Meybeck, Rose, and Gitz, 2019). In fact, forests and trees can play an important role in the adaptation of most of the sectors identified by countries as the most vulnerable.

Almost all sectors covered in the NAPs contain measures that use forests and trees as an adaptation mean. A first group concerns natural resources management, to restore degraded land, reduce soil erosion, restore water catchments, protect water tanks and rivers as well as mangrove protection and coastal planting to reduce shoreline erosion and protect against storms. A second group concerns agriculture, with wind breaks, shade trees and agroforestry in general, generally focused on biophysical rather than economic resilience. A third one regards the protection and greening of cities to reduce the urban heat island effect, while taking into account increased fire risks.

In most cases agroforestry is covered in the agriculture section of NAPs. The word “agroforestry” is mentioned in about two thirds of the NAPs, 3 countries mention it more than twice. There are only few mentions of the need to adapt agroforestry systems or planted trees (Sri Lanka, Cameroon and Chile). In some cases, agroforestry is mentioned (Togo) or broad measures like to increase the proportion of perennial plants and forest farming or planting 10% of agricultural land with forest trees (Sudan). In some countries broad measures or orientations implicitly include agroforestry like design farming systems to reduce thermal stress, plant shade trees (Chile), identify and manage ecosystems that provide ecosystem services that sustain agriculture systems, to prevent soil erosion, regulate nutrient cycles, pollinate plants, control pests and regulate water in quantity and quality (Colombia).

Discussion

Trees and forest-related measures generally focus on a single biophysical adaptation benefit, with little consideration of economic and social adaptation benefits. They often lack specificities on implementation details (“how”) or on the needed enabling environment, showing a lack of concertation with forest and tree specialists. This is consistent with broader findings that the weakest components of the plans submitted to the UNFCCC are “Coordination and Participation” (Woodruff and Regan, 2019) and that cross-sectoral cooperation can be used as a criteria of higher level of adaptation (Meybeck et al. 2020). It requires greater involvement of forests and tree researchers and stakeholders in the NAP process as well as a better organization of the relations of forestry with other sectors. This calls for a dual process, one internal to the forestry sector, including, as appropriate dedicated processes for specific value chains or geographical areas, and with other sectors, to understand their needs and expectations from forests and trees and, in return, explain the needs of the forestry sector to be able to adapt and contribute to the adaptation of other sectors (see figure 2).

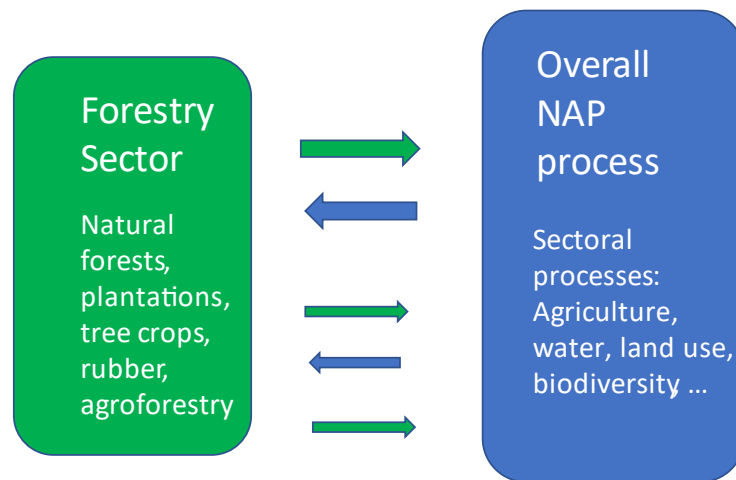
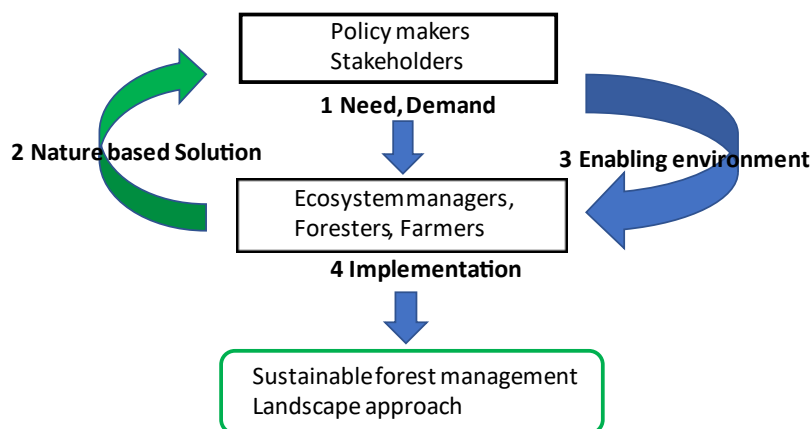


Figure 2: How to engage forestry in the NAP process

The green arrows represent contributions from forestry to the NAP process, the blue ones questions and contributions from the team piloting the NAP process and from sectoral groups engaged in it.

In fact, forests and trees provide nature Based Solutions (NBS) for adaptation. Gitz and Meybeck (2019) propose to consider the implementation of NBS as a dynamic relation between ecosystem managers and other stakeholders, including policy makers, calling for a two levels' governance as showed in figure 3:

- A dialogue between two categories of actors: decision makers and various stakeholders on the one hand, ecosystem managers that are directly involved and/or directly dependent on ecosystems on the other hand
- An evidence based and inclusive process to fine tune implementation options, using existing mechanisms and institutions for sustainable forest management and landscape approaches, among other.



Gitz & Meybeck, 2019

Figure 3: Nature Based Solutions: a four steps process

The construction of an NBS can be summarized in 4 steps:

- It starts from the identification of an external need (1) (implicit and identified by ecosystem managers) or demand (explicit, like in many NAPs for instance).
- Ecosystem managers can answer this demand by proposing an NBS (2); often accompanying it by the expression of conditions to implement this solution (institutional or financial).
- The implementation thus requires an enabling environment, to be provided by external stakeholders (3).
- The measures needed to implement the solution are then integrated in the management of the ecosystem, along with the pursuit of other objectives (4).

Such a process, that can be part of an ecosystem-based adaptation approach, generally needs to be conducted at landscape level with the appropriate articulation with the national process.

Conclusions

When considering forests and trees in relation to climate change the focus is generally on their contribution to mitigation of climate change. There is now as much urgency for adaptation as there is for mitigation, given that the climate is already changing and that when managing forests and trees we need to think at least 30 years ahead. In fact, there can be no long-term mitigation effect of a forest unless it adapts. Moreover, forests and trees can play a critical role for the adaptation of other sectors/activities and people including for most of the adaptation priorities highlighted by countries in their NDCs.

Published NAPs often integrate measures with forests and trees. They generally focus on a single biophysical benefit to mitigate a negative impact of climate change, without specificities (species, management practices) to achieve these adaptation objectives and often neglect socio-economic benefits. Measures related to the enabling environment needed for SFM and for planting trees, like on tenure, on seed and seedlings systems, are often lacking, especially for countries with no established tradition of forestry and planted forests. There is a need for better engagement of the forest and tree experts and actors in the NAP process to better understand the needs of other

sectors, to communicate the adaptation options that forests and trees can provide, their costs and benefits, including mitigation co-benefits and other environmental, economic and social co-benefits. The NAP process being evidence based, there is a need, and opportunity, for the scientific community to better engage on these issues.

The contributions of forests and trees to adaptation, still often overlooked, deserve to be appropriately promoted as nature-based solutions in order to increase support, both political and financial, for action in the forestry sector. Adopting an adaptation perspective as an entry point to climate action with trees can also facilitate the engagement of actors at different levels, from landscape to national and global, towards a more holistic approach to climate action and sustainable goals.

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