



## Implementing nature-based solutions in climate policies: What's in it for biodiversity?

### First lessons from Morocco and Tunisia

Aleksandar Rankovic, Stefanie Chan, Yann Laurans (IDDRI)

#### **NOT ALL NATURE-BASED SOLUTIONS HAVE THE SAME LEVEL OF AMBITION FOR BIODIVERSITY PROTECTION**

The actions contained in the nationally determined contributions (NDCs) that correspond to “nature-based solutions” (NBS) can be listed and ranked according to their level of ambition for biodiversity protection. In the NDCs, the most ambitious climate NBS in terms of biodiversity are in the minority.

#### **DIFFERENT CATEGORIES OF CHALLENGES FOR BIODIVERSITY**

The most ambitious NBS concerning biodiversity usually rely on existing conservation policies: during the implementation of the NDCs, additional financial and human resources will need to be mobilised in order to strengthen the effective implementation of these conservation policies. For the other types of NBS, the key requirement is ensuring better integration of biodiversity, not only in the technical characteristics of projects, but also in decisions made during sectoral and territorial reorganisation processes.

#### **DEVELOPING AND SUPPORTING NATIONAL TASK FORCES FOR THE INTERSECTORAL IMPLEMENTATION OF NBS CONTAINED IN THE NDCs**

It will be necessary to identify and support the actors capable of delivering intersectoral implementation, in both the public services and civil society, in order to ensure biodiversity challenges are taken into account throughout NDC implementation. Concerning the public services, coordination of the national focal points of the three Rio conventions (climate, biodiversity, desertification), joined by those responsible for implementing the Sustainable Development Goals, could form an initial hub within each country.

#### **FIVE RECOMMENDATIONS TO GUIDE THE IMPLEMENTATION OF CLIMATE NBS**

We make five recommendations to support biodiversity during climate NBS implementation. (1) Analysing NDCs in order to identify the NBS they contain and classify these according to their level of ambition and the guarantees they provide for biodiversity protection. (2) Prioritising NBS measures relying on policies that already explicitly integrate ecosystem protection or restoration targets. (3) Integrating biodiversity targets into climate NBS that do not give them explicit attention. (4) Evaluating the additional resources required to implement biodiversity-friendly climate NBS. (5) Identifying and supporting project leaders capable of intersectoral implementation of NBS.

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## INTRODUCTION

In the context of climate policies, “nature-based solutions” (NBS) have been receiving increasing attention in recent years, and have a prominent position in around 40 nationally determined contributions (NDCs), which represent the commitments made by the signatory states to the Paris Agreement (Laurans *et al.*, 2016). In order to contribute to the urgently needed action to mitigate climate change and its impacts, NBS seem to constitute concrete options that could be rapidly implemented and provide co-benefits for climate and biodiversity. This concerns not only mitigation (reducing greenhouse gas emissions, for example through reforestation programmes), but also adaptation (reducing certain types of vulnerability to climate impacts, for example by restoring coral reefs). However, the ways in which the incorporation of ecosystems into climate efforts could work either for or against biodiversity will require special attention during the implementation of the NDCs. What will NBS-type climate initiatives actually entail, and how can further overexploitation of ecosystems be avoided? How can the initiatives be prioritised according to their level of support for biodiversity? And how can the inclusion of ecosystems in climate strategies provide additional support for biodiversity policies?

The Mediterranean Basin is one of the most densely populated regions in the world, and also one that is likely to suffer the most serious climate disruption. Morocco and Tunisia are two of the countries that have given the greatest attention in their NDCs to the use of ecosystems in their climate strategies, and are the most ambitious countries in this respect in the whole of the Mediterranean Basin. Beyond their national contexts, the example set by these two countries therefore provides some initial recommendations that are more broadly applicable to countries wishing to

mobilise ecosystems in their climate strategies and to develop synergies between their climate policies and their biodiversity policies.

The findings presented here are the outcome of a pilot project led by IDDRI and the IUCN Centre for Mediterranean Cooperation (IUCN-Med), in collaboration with the governments of Morocco and Tunisia, through, respectively, the High Commission for Water, Forests and Desertification Control and the Ministry of Environment and Sustainable Development. In the context of this study, the NDCs of both countries were analysed in order to identify NBS-type measures, which were subsequently discussed during two workshops held in Rabat and Tunis, attended by actors from national governments, national and international experts, and members of civil society. These workshops produced some initial conclusions, which were discussed and developed during a side event held at COP22 in Marrakech. The analysis of this material is the main basis for this report.

The report is divided into four sections. It begins by discussing the identification of NBS-type actions contained in the NDCs of Morocco and Tunisia (section 1). These NBS are then classified into three types according to their level of ambition for biodiversity protection, and their distribution between these three types is examined (section 2). An analysis is then made of the potential and risks of the NBS for biodiversity (section 3). Finally, five recommendations are put forward to guide the implementation of the NBS contained in the NDCs (section 4).

## 1. IDENTIFYING NBS IN THE NDCs OF MOROCCO AND TUNISIA

The NBS concept is the latest in a long line of approaches aimed at accompanying ecosystem management and conservation. The term emerged recently in research and practice, and its exact meaning is still open to debate (Nesshover *et al.*, 2017). As a reference, we can use the definition adopted during the IUCN World Conservation Congress held in September 2016 in Hawaii, which defines NBS as “actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits”.<sup>1</sup> This definition has the advantage of limiting the focus to direct action on ecosystems (contrary to other definitions which include, for example, biomimetics), and corresponds to the analysis developed here, since it concentrates on the way in which the use of ecosystems for climate strategies can benefit biodiversity. Within the framework of climate strategies, which is where the term NBS first emerged and where they are typically promoted today, NBS can be understood as actions on ecosystems that help to reduce anthropogenic greenhouse gas emissions and/or to foster the adaptation of human societies to climate change.

For an overview of the similarities and differences between the NBS concept and, for example, ecosystem services or the ecosystem approach, we can refer to Nesshover *et al.* (2017), who propose a comparison between NBS and the most common conceptual frameworks used so far. The term NBS has been much in evidence in research programming at the EU level (European Commission, 2015) and its use is likely to increase in the coming years. Nevertheless, as underlined in a recent editorial in the journal *Nature* (Nature, 2017), it is especially through its implementation that the concept will demonstrate its added value for conservation, and this is point requires an acute attention from researchers and managers.

Against this backdrop, the first stage of the project consisted in examining the NDCs of Morocco and Tunisia to identify NBS-type measures, according to the above definition. Several difficulties emerged during this exercise. First, an initial group of difficulties is intrinsic to the format of the NDCs and the “freedom” of drafting given to each country. Thus, standardising the reading process, even for just two NDCs, may prove difficult.

Depending on the NDC, the measures may be listed according to key sectors (for example, energy, agriculture, forests), or listed all together at the end of the document. Moreover, the presentation of measures included in the sections on mitigation or adaptation may vary. Furthermore, the NDCs may not explicitly mention the actions planned, and may refer to other documents on the countries’ climate policies, which must therefore also be examined in order to identify the actions concerned. Finally, the description of actions in the NDCs is usually very succinct, in the form of lists, and identifying and analysing NBS in the NDCs must therefore be based on a relatively limited amount of information.

Second, since NBS cover a broad range of practices, it is sometimes difficult to decide whether or not an action can be considered as an NBS. The installation of new irrigation systems, for example, was considered by some project participants as an NBS, since irrigation makes it possible to support more abundant vegetation (hence the assimilation with “nature”), which itself stores carbon and prevents desertification. In addition, questions arose as to whether or not wind and solar energy, which are also “natural” elements, should be included in NBS. Similar questions were raised for actions proposing the development of organic farming, for example, and to what extent these actions fall within the scope of what is understood by NBS.

After several iterations, the decision was made to strictly apply the IUCN definition given above, and to select actions corresponding to the NBS approaches described in reference documents (in particular Cohen-Shacham *et al.*, 2016). Thus, only measures depending explicitly on processes underway in natural or anthropised ecosystems were considered. Elements such as solar radiation were not included in NBS, since their use, for renewable energy for example, is not (or only very indirectly) based on ecosystem characteristics. The full lists of the measures identified as NBS for the two countries are provided in Tables 1 to 4.

## 2. NOT ALL CLIMATE NBS HAVE THE SAME LEVEL OF AMBITION FOR BIODIVERSITY PROTECTION

Based on these lists of NBS-type actions, the workshops (in Rabat and Tunis) first focused on “ranking” these measures according to the level of attention they seem to give to biodiversity, using both qualitative and quantitative criteria, especially those proposed in the eight IUCN principles for NBS, and in particular principle number 5:

1. Motion 077, “Defining Nature-based Solutions”: <https://portals.iucn.org/congress/motion/077>

NBS “maintain biological and cultural diversity and the ability of ecosystems to evolve over time” (Cohen-Shacham *et al.*, 2016).

Each action was thus collectively examined to determine whether conservation issues were explicitly mentioned and quantified (the number of hectares concerned, for example) or, in other cases, whether certain terms suggested that the action was “biodiversity-oriented”: for example, use of the term “reforestation” rather than “afforestation”, suggesting that the action contains an element of ecological restoration. Similarly, this exercise also identified measures that, although based on ecosystem engineering or on the use of specific living organisms, gave only limited attention to biodiversity targets.

These efforts enabled the identification of three types of NBS, according to their level of ambition for biodiversity protection.

- **Type 1** contains approaches based on the protection or restoration of ecosystems, such as forests with little human intervention at present or coastal ecosystems.
- **Type 2** concerns approaches based on biological engineering actions, aimed at specific processes or organisms, such as agricultural soil restoration, the use of legumes, or plant stabilisation of sand dunes.
- **Type 3** includes actions based partly on living organisms, but incorporated into broader territorial or sectoral reorganisation programmes, such as the development of organic farming, the definition of new eco-tourism zones or better promotion of seafood products.

For each action, the final column in Tables 1-4 indicates the type of NBS to which it has been attributed.

**Table 1.** List of NBS identified in actions in the mitigation section in Morocco's NDC.

<b>NBS in the unconditional actions in Morocco's portfolio of actions for the mitigation section of its NDC</b>	<b>Page of NDC</b>	<b>Type of NBS</b>
<i>Olive tree programme by 2020:</i> Planting of 447 000 hectares of olive trees in areas that are unfit for year-round crops to limit soil erosion and improve small farmers' income (Action 15)	28	2
<i>Fruit Arboriculture Programme (excluding citrus and olive trees) by 2020:</i> Planting of 160 000 hectares of fruit trees to improve and diversify farmers' income, especially in fragile mountain areas (Action 16)	28	2
<i>Citrus Planting Programme by 2020:</i> Planting of 45 000 hectares of citrus (density of 600 plants/hectare) to improve both farmers' revenues and export earnings (Action 17)	28	2
<i>Cactus Planting Programme by 2020:</i> Revegetation of bare or eroded lands with 128 600 hectares of cacti in drylands to enhance smallholder farmers' and women's cooperative income (Action 18)	28	2
<i>Date Palm Tree Planting programme by 2020:</i> Planting 3 million date palm trees to enhance oases' productivity rate, combat desertification and help prevent the exodus of youth people from rural areas (Action 19)	28	2
<i>National Development of Rangelands Programme and Regulation of Transhumant Flows: First phase by 2020:</i> Develop rangelands in a way that will combat desertification, enhance livestock farmers' income and protect biodiversity (Action 20)	28	3
<i>Afforestation and Reforestation Programme 2010-2030:</i> Afforestation and reforestation over 40 000 hectares between 2010 and 2030 to combat deforestation, the loss of water resources, animal, plant and land biodiversity. Protect upstream river basins against silting and water erosion (Action 21)	29	1
<i>Programme Combatting Silting 2010-2030:</i> Stabilization of dunes by planting vegetation between 2010 and 2030 (500 hectares per year) to combat silting and desertification. (Action 22)	29	2
<i>Management of Forestry Climate Risk 2010-2030:</i> Launch in May 2016 of a National Centre for Climate and Forestry Risk Management (wildfires, health of forests): surface area of 1 536 hectares per year between 2010 and 2030 (Action 23)	29	1
<b>NBS in the conditional actions in Morocco's portfolio of actions for the mitigation section of its NDC</b>	<b>Page of NDC</b>	<b>Type of NBS</b>
<i>Olive Tree Programme 2020-2030:</i> Extension of action #15 over 232 000 hectares (Action 44)	31	2
<i>Fruit Arboriculture Programme (excluding citrus and olive trees) 2020-2030:</i> Extension of action #16 over 112 000 hectares (Action 45)	31	2
<i>Citrus Planting Programme 2020-2030:</i> Extension of action #17 over 28 000 hectares (Action 46)	31	2
<i>Argan Tree Planting Programme 2020-2030:</i> Planting of argan trees on 38 000 hectares to enhance vulnerable communities' resilience to climate change, increase carbon storage in biomass and soils, and indirectly reduce the industrial and anthropogenic pressure on natural argan tree forests (Action 47)	31	2
<i>Cactus Planting Programme 2020-2030:</i> Extension of action #18 over 66 162 hectares (Action 48)	31	2
<i>Fruit Tree-Planting Programme 2020-2030:</i> Planting of 15 000 hectares of fruit trees to improve and diversify small farmers' income (Action 49)	31	2
<i>Date Palm Tree Planting Programme by 2020-2030:</i> Extension of action #19 over 1.5 million date palm trees (Action 50)	31	2
<i>National Development of Rangelands Programme and Regulation of Transhumant Flows 2020-2030:</i> Extension of action #20 over 300 000 hectares between 2020 and 2030 (Action 51)	31	3
<i>Afforestation and Reforestation Programme 2020-2030:</i> Extension of action #21 to reach 60 000 hectares per year (Action 52)	31	1
<i>Program Combatting Silting 2020-2030:</i> Extension of action #22 to reach 800 hectares of vegetation per year. (Action 53)	32	2
<i>Management of Forestry Climate Risk 2020-2030:</i> Extension of action #23 to reach 2 304 hectares per year in managed surface area (Action 54)	32	1

**Table 2.** List of NBS identified in actions in the adaptation section in Morocco's NDC

Sector (as mentioned in NDC)	NBS in the adaptation targets contained in Morocco's NDC	Page of NDC	Type of NBS
<b>Water</b>	Various programs and actions aimed at preserving water resources and natural habitats, and at improving the management of extreme climate events, for an overall investment of USD 5.7 billion	21	1
<b>Forests</b>	The replenishment of 200,000 hectares of forests	22	1
	Protecting 1,500,000 hectares against erosion, which will include the prioritization of 22 basins, for USD 260 million	22	1
	Afforesting 600,000 hectares for USD 46 million	22	1
<b>Fisheries and Aquaculture</b>	Reach a 95% rate of traded species managed sustainably.	22	2
	Reduction by 50% of the quantity of fish meal created from fresh fish	22	2
	Establishment of marine protected areas representing 10% of the Exclusive Economic Zone	22	1
	Development of two hatcheries dedicated to restock five endangered coastal species	22	1
	Restoring 50% of damaged marine habitats	22	1
	Increasing by 50% the volume of sea products utilized and marketed	22	3

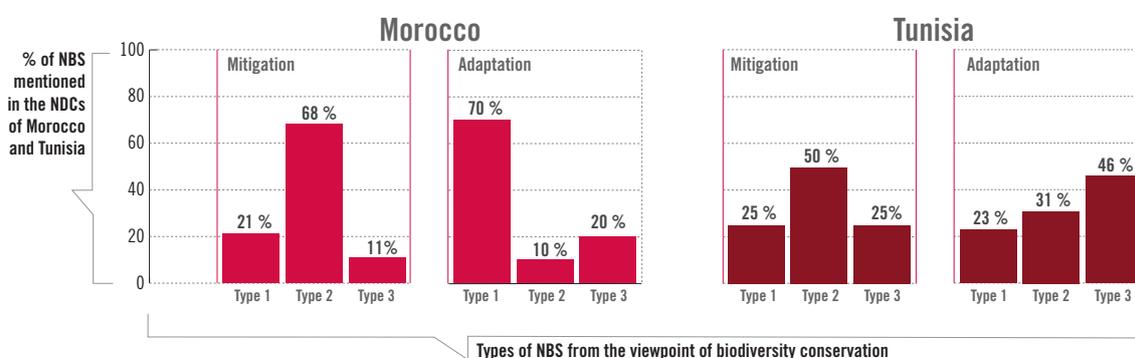
**Table 3.** List of NBS identified in actions in the mitigation section in Tunisia's NDC

Sector (as mentioned in NDC)	NBS in actions in the mitigation section in Tunisia's NDC	Source	Reference in NDC	Type of NBS
<b>Agriculture</b>	Promote and develop conservation agriculture (CA) to store carbon in soil and limit the use of synthetic fertilizers	First biennial report of Tunisia to the UNFCCC (p. 56)	Implicit	3
	Promote organic agriculture in order to limit N <sub>2</sub> O emissions due to the use of fertilisers	First biennial report of Tunisia to the UNFCCC (p. 56)	Yes (p. 11)	3
	Increase the use of legumes during crop rotations, to reduce N <sub>2</sub> O emissions	First biennial report of Tunisia to the UNFCCC (p. 56)	Yes (p. 11)	3
<b>Forests</b>	Totalise 240 000 ha of new reforestation (2015-2034) by using indigenous forest species, on currently deforested land	First biennial report of Tunisia to the UNFCCC – NAMAs Forestry (p. 72)	Yes (NAMA Forests mentioned)	1
	Reconstitute the forest cover of 60 000 ha of young forest stands on the period 2015–2034, and of which the cover is below 50% in the forests of the Tunisian dorsal and in the North of Tunisia.	First biennial report of Tunisia to the UNFCCC – NAMAs Forestry (p. 72)	Yes (NAMA Forests mentioned)	1
	Reconstitute the regeneration capacity of 60 000 ha between 2015 and 2034 of natural forests that have become senescent, and of which the natural regeneration is blocked in the dorsal and the North	First biennial report of Tunisia to the UNFCCC – NAMAs Forestry (p. 72)	Yes (NAMA Forests mentioned)	1
	Plant fodder trees on 100 000 ha of rangelands in arid, semi-arids, and Saharan zones, and in general, in zones that are desertified or at high risk of desertification	First biennial report of Tunisia to the UNFCCC – NAMAs Forestry (p. 72)	Yes (NAMA Forests mentioned)	2
	Consolidation of water and soil conservation works by forestry plantations	First biennial report of Tunisia to the UNFCCC (p. 57)	Implicit	2
	Consolidation of water and soil conservation works by olive-tree plantations	First biennial report of Tunisia to the UNFCCC (p. 57)	Implicit	2
	Consolidation of water and soil conservation works by fruit plantations	First biennial report of Tunisia to the UNFCCC (p. 57)	Implicit	2
	Improval of rangelands by cactus plantations	First biennial report of Tunisia to the UNFCCC (p. 57)	Implicit	2
	Improval of rangelands by replanting fodder shrubs	First biennial report of Tunisia to the UNFCCC (p. 57)	Implicit	2

**Table 4.** List of NBS identified in actions in the adaptation section in Tunisia's NDC

Sector (as mentioned in NDC)	NBS in actions in the adaptation section in Tunisia's NDC	Page of NDC	Type of NBS
Agriculture	Adapting irrigated crops in the central regions	17	3
	Adapting mixed farming-livestock production to climate change in vulnerable regions	17	3
	Updating the agricultural map to take into account the impacts of climate change	17	3
	Conserving and exploiting genetic heritage to adapt cereal crops to climate change, developing innovative systems for arable crops	17	2
Ecosystems	Rehabilitation of forest nurseries and the expansion of indigenous and multi-use species	17	2
	Holistic management of cork oak forests in zones at high risk of fire in the north-west of the country	17	1
	Management of the degraded rough grazing and esparto areas in the central and southern regions	17	1
	Conservation of the ecological functions of low-lying coastal areas	17	1
	Integrated rural development of vulnerable drainage basins, sub-drainage basins and flood control	17	2
	Biological consolidation of work to combat silting in the south of Tunisia and support the implementation of regional action plans to counter desertification.	17	2
Tourism	Restoration of the Tunisian touristic sea coast and protection of tourist areas against the advance of the sea	17	3
	Definition of climatic and touristic regions and adaptation of the division of eco-touristic circuits	17	3
	Development of a range of services that are at once alternative and complementary to seaside tourism, particularly in terms of health, culture, sport and environment	17	3

**Figure 1.** Percentage of NBS actions mentioned in the NDCs of Morocco and Tunisia according to their level of ambition for biodiversity protection.



Type 1 NBS are those that most explicitly integrate biodiversity protection targets. For types 2 and 3 NBS, actions as currently set out seem to focus more on the use of living organisms for specific productive goals. Among the measures identified in the NDCs of Morocco and Tunisia, Figure 1 represents the proportion of actions for each type of NBS. For both countries, NBS corresponding to types 2 and 3 are predominant, with the exception of the NBS listed under adaptation in Morocco's NDC. Here, the NBS are mostly of type 1. This finding is due to the fact that in Morocco's NDC, a significant proportion of the NBS in the adaptation section are specifically aimed at ecosystem protection and restoration targets, especially for

forest, marine and coastal ecosystems. This can be explained by—or is at least consistent with—the general vision guiding Moroccan adaptation policies (p. 19-20 of the NDC), a specific expression of which is the desire to develop “an ecosystem-based adaptation approach” to strengthen ecosystem resilience.

It is thus likely that biodiversity issues received greater attention in Morocco's NDC preparation process, and were seen in particular as a guarantee of ecosystem resilience to the impacts of climate change. In Morocco's case, this attention to biodiversity seems to have been greater in the adaptation section than in the mitigation section, but appears to have been relatively similar for both

sections in Tunisia. In comparison with Morocco, Tunisia has a higher proportion of NBS measures corresponding to extensive sectoral and/or territorial reorganisation processes (type 3), especially for adaptation. This is likely due to the recent history of the country and to its own constraints in terms of socio-economic reorganisation, especially in key economic sectors such as agriculture and tourism.

Table 5 lists: (1) the three types of NBS as identified here; (2) the corresponding NBS approaches (typology by Cohen-Shacham *et al.*, 2016); and (3) examples of actions taken from the NDCs of

Morocco and Tunisia. As previously mentioned, understanding what NBS can actually contribute to biodiversity conservation, and under which conditions, is a pressing issue for researchers and managers. In relation to the literature on NBS, a first outcome of this project is that it has produced this “classification by targets” of NBS, with the identification of three major types of NBS *seen from the perspective of biodiversity*. In particular, this typology enables a simpler, systematic identification of the potential and risks of climate NBS for biodiversity.

**Table 5.** Different types of NBS contained in the NDCs according to their level of ambition for biodiversity, correspondence with the IUCN NBS approaches and examples of actions listed in the NDCs of Morocco and Tunisia

Type of NBS according to level of attention to biodiversity	NBS approaches defined by IUCN	Examples of actions in NDCs of Morocco and Tunisia
<b>Type 1:</b> NBS relying on ecosystem protection or restoration with high ambition for biodiversity	Approaches based on ecosystem protection	“Establishment of marine protected areas representing 10% of the Exclusive Economic Zone” (Moroccan NDC – Adaptation) “Conservation of the ecological functions of low-lying coastal areas.” (Tunisian NDC – Adaptation)
	Approaches based on ecosystem restoration	“Afforestation and reforestation over 40,000 hectares between 2010 and 2030 to combat deforestation, the loss of water resources, animal, plant and land biodiversity. Protect upstream river basins against silting and water erosion” (Moroccan NDC – Mitigation) “Restoring 50% of damaged marine habitats” (Moroccan NDC – Adaptation) “Reconstitute the regeneration capacity of 60,000 hectares between 2015 and 2034 of natural forests that have become senescent, and of which the natural regeneration is blocked in the dorsal and the North” (Tunisian Forest NAMA – Mitigation)
<b>Type 2:</b> NBS relying on targeted use of living organisms without explicit biodiversity criteria	Approaches based on living organisms for specific (sectoral) problems	“Planting of 447,000 hectares of olive trees in areas that are unfit for year-round crops to limit soil erosion and improve small farmers’ income” (Moroccan NDC – Mitigation) “Plant fodder trees on 100,000 ha of rangelands in arid, semi-arids, and Saharan zones, and in general, in zones that are desertified or at high risk of desertification” (Tunisian Forest NAMA – Mitigation)
	Approaches linked to ecological infrastructure	“Stabilization of dunes by planting vegetation between 2010 and 2030 (500 hectares per year) to combat silting and desertification” (Moroccan NDC – Mitigation) “Biological consolidation of work to combat silting in the south of Tunisia and support the implementation of regional action plans to counter desertification” (Tunisian NDC – Adaptation)
<b>Type 3:</b> NBS integrated into extensive sectoral and territorial reorganisation processes, whose impacts on biodiversity remain to be defined	Approaches based on integrated/ecosystem management	“Develop rangelands in a way that will combat desertification, enhance livestock farmers’ income and protect biodiversity” (Moroccan NDC – Mitigation) “Increasing by 50% the volume of sea products utilized and marketed” (Moroccan NDC – Adaptation) “Promote organic agriculture in order to limit N <sub>2</sub> O emissions due to the use of fertilisers” (Premier rapport biennal Tunisie – Mitigation) “Definition of climatic and touristic regions and adaptation of the division of eco-touristic circuits” (Tunisian NDC – Mitigation)

### 3. POTENTIAL AND RISKS OF CLIMATE NBS FOR BIODIVERSITY

Based on the lists of NBS, another goal of the workshops was to identify the policies, institutions and actors underpinning the implementation of each action. These discussions were compared with the typology described above, and the workshops, along with the side event held in Marrakech during COP22, were analysed. For each type of NBS, this helped to identify what appears to be the main challenge for the implementation of the actions contained in the NDCs from the viewpoint of biodiversity.

For type 1 NBS, which are incorporated into ecosystem protection or restoration policies, the challenge concerns the effectiveness of the action: will the NBS ensure that substantial resources are (finally) devoted to conservation and restoration policies and that current obstacles are removed?

Type 2 NBS are associated with sectoral targets based on living organisms (certain trees, plants, etc.), but which are more removed from biodiversity targets as such. The compatibility of these NBS with biodiversity conservation will depend on two key variables: (1) the area in which the action will take place, the “where”; and (2) the ecological conditions of the action, the “how”. The “where”: if the extension of an olive grove enables the return of abundant, relatively diverse vegetation to

a previously degraded plot of trees, the outcome for biodiversity could be positive. On the other hand, if this extension is detrimental to natural ecosystems, for example a forest, steppe or savannah, the outcome for both climate and biodiversity will most probably be more negative. The “how”: if plantations involve monocropping (or even the use of clones), the impact on biodiversity could be more negative than if the stands of trees are varied and include native species.

Type 3 NBS are integrated into broader territorial or sectoral reorganisation programmes. These NBS are at least partly based on ecosystems, but their main objectives do not generally mention biodiversity issues, or only in a very secondary way. In this case, the challenges for biodiversity primarily concern taking greater precautions to avoid the overexploitation of ecosystems and maintaining biodiversity in the areas concerned. For example, an increase in marine sector revenue, based on marine and coastal ecosystems, raises the question of the risks of overexploitation of fisheries resources. Similarly, although it almost certainly enables a reduction in the use of crop protection products, the promotion of organic farming, once translated to the plot level, will nevertheless encounter the same challenges as type 2 NBS. It will therefore be important to ensure biodiversity challenges remain visible and are supported throughout the development of these programmes.

**Table 6.** Implementation challenges from the perspective of biodiversity for each type of NBS contained in the NDCs, associated biodiversity-climate policy synergies and risks for biodiversity

Type of NBS according to level of attention to biodiversity	Challenges for biodiversity in NDC implementation	Potential biodiversity-climate policy synergies	Risks for biodiversity
<b>Type 1:</b> NBS relying on ecosystem protection or restoration with high ambition for biodiversity	Supporting the implementation of existing biodiversity conservation policies	<ul style="list-style-type: none"> <li>- Climate policies provide political legitimacy and funding for biodiversity policies</li> <li>- Biodiversity policies can help to use existing policies to underpin climate policies, sometimes over vast areas</li> </ul>	Risk that NBS will provide no additional support for biodiversity
<b>Type 2:</b> NBS relying on targeted use of living organisms, without explicit biodiversity criteria	Better defining the technical characteristics of biological engineering measures in order to include biodiversity conservation in them	Climate NBS may provide “soft” (and potentially inexpensive) options for mitigation and adaptation in some sectors, facilitating the adoption of measures to protect both the climate and biodiversity	Risk of excessive sectoral constraints, especially in terms of land use, insufficient integration of biodiversity and artificial NBS that increase pressure on ecosystems
<b>Type 3:</b> NBS integrated into extensive sectoral and territorial reorganisation processes, whose impacts on biodiversity remain to be defined	Assessing the current state of ecosystems and additional pressures expected for different sectors, and planning precautions for biodiversity in the areas concerned	Climate NBS can bring together climate and biodiversity actors and facilitate the creation of environmental coalitions to influence decisions made during reorganisation processes	Risk of biodiversity being “shelved” during reorganisation processes, being in a weak position faced with more powerful sectors, increased pressure on biodiversity

Table 6 summarises these different points alongside the potential and risks for biodiversity for each type of NBS. In particular, the potential is expressed in connection with the political synergies NBS could catalyse between biodiversity and climate. From the viewpoint of biodiversity, the priority would be to support the implementation of type 1 NBS. In general, their implementation mainly requires political support and the development of additional resources to those currently devoted to protection, as well as the removal of a certain number of institutional obstacles. For type 2 NBS, biodiversity needs to be better integrated into the technical characteristics of projects. And for type 3 NBS, it is important to ensure biodiversity is supported in decisions made during sectoral and territorial reorganisation processes.

#### 4. FIVE RECOMMENDATIONS TO GUIDE THE IMPLEMENTATION OF CLIMATE NBS

After the signature of the Paris Agreement, in addition to increasing the ambition of commitments, a key challenge for climate policies concerns NDC implementation. This means progressing from a “list of resolutions” to policy programmes that are prioritised, quantified and organised.

Since climate NBS are based on ecosystems and the resources they provide, they are situated at the interface between different sustainability issues, including climate, biodiversity and development. Moreover, NBS potentially mobilise all types of ecosystems for the climate services they can provide. These measures therefore potentially concern large parts of national territories. NBS could thus constitute an analytical framework for policies and projects aimed at taking action on natural heritage for climate purposes, and could be used to arbitrate, monitor and evaluate them according to their level of compatibility and synergy with other sustainable development goals, especially biodiversity protection.

Likewise, for each NBS, it will be essential to evaluate its contribution to the implementation of national climate targets. This will also help to increase the credibility of these measures as effective “solutions”. The mitigation section in Morocco’s NDC is a good example: in annex 1, an estimation of the potential for greenhouse gas emissions reductions is given for each of the mitigation measures. The latest biennial report from Tunisia to the UNFCCC, which includes the calculations made during the development of different NAMAs (Nationally Appropriate Mitigation Actions), is another example of this type of quantification.

To ensure NBS implementation benefits the different sustainable development agendas, especially for climate and biodiversity, the three national focal points of the “Rio conventions” (biological diversity, climate change and desertification), joined by those responsible for implementing the Sustainable Development Goals, could form an initial coordination hub within each country.

This will clearly require additional financial and human resources. In particular, greater cooperation efforts will be needed to help numerous countries to implement the “conditional” measures in their NDCs, in other words those that will be based on assistance from development banks and the Global Environment Facility. For example, in Morocco’s case, for NBS this represents 11 measures (nine of which are in fact extensions of unconditional measures) for the mitigation section. In Morocco’s NDC, the funding required for implementation of the conditional measures is estimated at 2.58 billion dollars (p. 31-32). Where adaptation is concerned, Morocco’s NDC announces the forthcoming publication of its budget requirements, but already stresses the need for “significant support from the international community and creditors” if it is to reach its targets (p. 20). For Tunisia, for the 2015-2030 period, funding requirements for mitigation are estimated at 967 million dollars for all actions (NBS-type actions, listed here, and others) concerning agriculture, and at 566 million dollars for all actions (ditto) concerning forests and other land uses (p. 6). For adaptation, Tunisia’s NDC estimates funding requirements at 21 million dollars for agriculture, 782 million dollars for ecosystems and 17 million dollars for tourism—including all types of actions (p. 18).

In this context, to give greater prominence to biodiversity in the implementation of climate NBS and future programmes supported by financial mechanisms, this pilot project has produced five recommendations for the international community:

**1. For each country, analysing NDCs in order to identify the NBS they contain** and classifying these according to their level of ambition and the guarantees they provide for biodiversity protection.

**2. Prioritising NBS measures based on policies that already explicitly integrate ecosystem protection or restoration targets**, and understanding how their translation into “climate NBS” can provide additional support for their effective implementation.

**3. Integrating biodiversity targets into climate NBS that do not give them explicit attention.** In the NDCs, the majority of NBS are based on biological elements such as trees, but do not explicitly set any ecosystem conservation targets.

**4. Evaluating the additional resources required** to implement biodiversity-friendly climate NBS. Characterising the factors that have so far hampered the implementation of biodiversity-friendly policies, and the necessary and feasible support from climate policies.

**5. Identifying and supporting project leaders capable of intersectoral implementation**

**of NBS.** NBS are situated at the interface between conservation, agricultural, forestry, tourist and other policies, and it will be necessary to identify and support the groups of actors, in both government and civil society, capable of ensuring the challenges for biodiversity remain visible throughout the NDC implementation process. ■

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## Implementing nature-based solutions in climate policies: What's in it for biodiversity?

### First lessons from Morocco and Tunisia

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