Nature Based Solutions: Reporting and analyzing insights from Europe

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ITS2.14/HS12.2 – Nature-Based Solutions for Global Environmental Challenges and SDG nexus research

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1. Background: The ARTISAN project

Achieving Resiliency by Triggering Implementation of nature-based Solutions for climate Adaptation at a National scale (2020-2028)

**Coordinator**
- French Office of Biodiversity.

**Objectives**
- Demonstrating and valorizing the potential of NBS.
- Raising awareness and training stakeholders on NBS.
- Supporting and amplifying NBS projects in Metropolitan and overseas France.

**Number of partners and pilot sites**
- 28 partners.
- 40 actions and 10 NBS projects in Metropolitan-Overseas France.

**Foreseen plans**
- A wide scale Demonstrator program.
- Conception, adaptation and dissemination of decision support tools.
- Creation and animation of actor networks.
2. Objectives of the presented work

Action A2: Status report on knowledge building needs in order to mainstream Nature-Based adaptation Solutions (NBaS)

- **Outcome 1:** A multi-scale state of the art on NBaS

  *Target scales:* France (National), Europe (Regional) and International

  *Research problematic:* Revealing the dynamic, progressive and ongoing to climate change related notions, and ultimately to NBaS.

- **Outcome 2:** An inventory of research needs for NBaS in France

  *Target scale:* France (National)

  *Research problematic:* Prioritizing research needs for mainstreaming NBaS and for accurately mapping actors.
2. Objectives of the presented work

Why a multi-scale approach?

- Through the analysis of different scales, micro to macro insights are obtained.
- The national analysis provides insights on the past, current and future orientations of NBAS in France → Scientific literature
- The national to regional approach reveals France’s position with respect to the European continent → EU H2020 research programme
- The regional to international approach reveals the position of Europe with respect to the global trends → International institutional reports

The analysis of each scale draws up independent findings, which at a combined state allow the establishment of a knowledge inventory.
3. The National scale: Scopus database

Objectives
Determining the history of NBaS in France (scientific literature)
- Examining the status of NBS to NBaS
- Identifying types and purposes
- Mapping NBaS in France
- Determining the concerned actors (labs, funding parties ...)

Methodology
Searching the Scopus database for scientific literature (i.e. journal articles) using three different queries to study the transition to NBaS

<table>
<thead>
<tr>
<th>Query</th>
<th>Records found</th>
<th>Records retained</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1132</td>
<td>368</td>
</tr>
<tr>
<td>2</td>
<td>108</td>
<td>66</td>
</tr>
<tr>
<td>3</td>
<td>36</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>1276</td>
<td>456</td>
</tr>
</tbody>
</table>

1- “nature based solutions” OR “Ecosystem-Based Adaptation” OR “Urban green infrastructure” OR “green solutions” OR “ecosystem services” OR “green blue solutions” OR “ecological restoration” OR “urban forests” OR “renaturing” OR “ecological engineering” OR “ecosystem-based mitigation” OR “natural infrastructure” OR “natural capital” OR “ecosystem services” AND “stakeholders” OR “actors” OR “citizens” OR “communities” OR “municipalities” AND “France” AND “climate change” AND “Adaptation”

2- “nature-based solutions” AND “France”

3- “nature-based solutions” AND “climate change” AND “adaptation” AND “France”
3. The National scale: Publication trends

- Trends of scientific literature on NBS and associated concepts in France are somewhat similar to the international trends determined by the IUCN.

- Publications on NBS (in strict terms) started appearing in 2016 in France, while those on NBaS started to appear in 2017.

- Both French NBS and NBaS curves indicate an increasing trend, however, publications on NBaS are still relatively scarce.
3. The National scale: Actors - laboratories

NBS labs and mediums

<table>
<thead>
<tr>
<th>Medium</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>32</td>
</tr>
<tr>
<td>Sea and coastal</td>
<td>22</td>
</tr>
<tr>
<td>Other</td>
<td>19</td>
</tr>
<tr>
<td>Humid</td>
<td>18</td>
</tr>
<tr>
<td>Agriculture</td>
<td>16</td>
</tr>
<tr>
<td>Forest</td>
<td>12</td>
</tr>
<tr>
<td>All</td>
<td>12</td>
</tr>
<tr>
<td>Mountainous</td>
<td>5</td>
</tr>
<tr>
<td>Soil and land</td>
<td>2</td>
</tr>
<tr>
<td>Diverse</td>
<td>1</td>
</tr>
</tbody>
</table>

- A rich distribution of NBS related labs can be seen in France. Accordingly, a high level of scientific awareness on NBS in the country can be deduced.
- Spatially, several clusters of NBS labs can be seen, namely in the Parisian region, the Grenoble-Alps region and the French South.
- Almost the entire French coast, both on the Mediterranean Sea and Atlantic Ocean, sides has actively NBS working labs.

https://www.google.com/maps/d/viewer?mid=1B43M66m6pBtJYl5Cv-izzpXSK_Eqc8NG&ll=46.26623984248091%2C5.2999740791577175&z=6

“nature-based solutions” AND “France”

Number of labs: 126, **dominant medium: Urban**
3. The National scale: Actors - laboratories

NBaS labs and mediums

<table>
<thead>
<tr>
<th>Medium</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>16</td>
</tr>
<tr>
<td>Sea and coastal</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
</tr>
<tr>
<td>Forest</td>
<td>7</td>
</tr>
<tr>
<td>Humid</td>
<td>4</td>
</tr>
<tr>
<td>Mountainous</td>
<td>4</td>
</tr>
<tr>
<td>Humid (watersheds)</td>
<td>3</td>
</tr>
<tr>
<td>Humid (watersheds) and urban</td>
<td>3</td>
</tr>
<tr>
<td>Mountainous, natural, agricultural, and humid</td>
<td>2</td>
</tr>
<tr>
<td>Mountainous, humid (watershed), urban, humid (estuary), natural (valley)</td>
<td>1</td>
</tr>
</tbody>
</table>

- Graphically, the number of labs working on NBaS is much less than those shown in the previous map.
- Spatially, the distribution of the NBaS related labs shows two aggregations: the first is in the Parisian region while the second lies in the South-Eastern section of the country in the Grenoble-Alpine region.
- The Northern, North-Eastern and Central parts of France are relatively short on NBaS related labs.

“nature-based solutions” AND “climate change” AND “adaptation” AND “France”
Number of labs: 46, dominant medium: Urban

https://www.google.com/maps/d/u/0/edit?mid=1O2un6-5uOGnUEjQKPja1P7GhSSDiVlmw&usp=sharing
3. The National scale: Actors – Funding parties

"nature-based solutions" AND "France"
3. The National scale: Actors – Funding parties

"nature-based solutions" AND "climate change" AND "adaptation" AND "France"

Funding parties

- Horizon 2020 Framework Programme
- Agence Nationale de la Recherche
- European Commission
- Conseil Régional Provence-Alpes-Côte d'Azur
- H2020 Marie Skłodowska-Curie Actions
- Office National de l'Eau et des Milieux Aquatiques
- Ministry of Environment
- Interreg
- H2020 Spreading Excellence and Widening Participation
- H2020 Society
- European Regional Development Fund
- Conseil Régional des Pays de La Loire
- Conseil Départemental des Alpes Maritimes
- Agence de l'environnement et de la maîtrise de l'énergie
- Agence de l'Eau Rhône Méditerranée Corse
- Agence Française de Sécurité Sanitaire de l'Environnement et du Travail
4. The Regional scale: H2020 projects

Objectives
- Lessons learned from completed projects
- Ongoing efforts
- Target areas (statistics by European countries)
- Potential Success stories and opportunities
- Limitations, challenges

Methodology
Searching the CORDIS database for NBaS related H2020 projects

<table>
<thead>
<tr>
<th>H2020 database search</th>
<th>Project acronym</th>
<th>Full name of the project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Validation of projects against supporting evidence (Wild et al. 2020) and Oppla database</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status</th>
<th>Project results from CORDIS database and each project’s website</th>
<th>Sorting of outcomes per type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning-Ending</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ongoing/Ended</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Filtering deliverables per problematic, thematic, target area and NBS studied

| Extracting information of interest | 41 projects (16/41) | ~ 616 outcome | ~ 239 deliverables |

A two level classification:
- General → by medium
- Detailed → by pilot site, problematic and NBaS (projected or implemented)

**Projects:**
- DRYvER
- PONDERFUL
- MaCoBioS
- CONEXUS
- INTERLACE
- Green CURIOCYT
- CLEARING HOUSE
- OPERANDUM
- proGIreg
- EuPOLIS
- FutureMARES
- VARCITIES
- GrowGreen
- RECONECT
- UNaLab
- Nature4Cities
- PHUSICOS
- CLEVER Cities
- REGREEN
- NATURVATION
- ReNATURE
- NAIAD
- EdiCitNet
- URBAN GreenUP
- URBiNAT
4. The Regional scale: H2020 projects

Detailed classification

<table>
<thead>
<tr>
<th>Table 8: The OPERANDUM project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
</tr>
<tr>
<td>OPERANDUM</td>
</tr>
</tbody>
</table>

A detailed classification of the retained projects was performed to filter them according their study areas, general and specific environmental challenges, medium of interest, type of NBaS and status (prospected or realized).

The aim of this classification is to filter deliverables for curating information of interest.
5. International scale: UN bodies projects

Objectives
When did the international scope shift to NBaS

- The UN Environment Programme (UNEP) was placed to lead the UN, by supporting a coordinated global effort on NBS
- Building on the outcomes of the NBS manifesto developed during the Climate Action Summit to unlock the full potential of nature
- Paving the way for the success of the United Nations Decade of Ecosystem Restoration 2021-2030.

- NBS were actively promoted in the IUCN’s 2009 position paper for the UNFCCC COP 15
- Early efforts were directed towards creating and implementing mitigation measures.
- As of 2010, with increasing knowledge of the inevitable short and medium term effects, adaptation is now seen in the UNFCCC as an equally important strategy, next to mitigation.
5. International scale: IUCN

- A chronological shift from EbA → NBS → NBaS.

- NBaS appeared in 2016. This reflects a relative recent acknowledgment of these solutions.
NBS can address both the causes and consequences of climate change.

Nonetheless and most importantly: Beyond about the 2º and 3º C temperature increase, impacts on many ecosystems are likely to be irreversible making NBaS-NBS powerless.

NBS failed interventions were attributed to a lack of understanding of the functioning of ecosystems and ecosystem services.

Nationally Determined Contributions (NDCs) to the UNFCCC that integrate adaptation and mitigation efforts in relation to oceans and coastal ecosystems are not being given the appropriate level of attention.

The prominence of NBS in the NDCs generally does not translate into robust evidence-based targets. Only around 17% of NDCs involving NBaS set quantifiable and robust targets. Even where measurable targets are set, it is unclear whether they will be sufficient to meet the adaptation needs.
5. International scale: UNFCCC
Chronological order and brief summary of key findings

- Adaptation was fully acknowledged.
- The Adaptation Committee was established.
- Adaptation planning is relatively recent and represents an area which requires greater attention.
- Rio conventions on adaptation CBD-UNCCD - UNFCCC
- Adaptation to climate change will be an essential pillar of the future climate regime that was negotiated for adoption in 2015 and which will shape adaptation under the Convention beyond 2020.
- The knowledge gap on adaptation is one of the largest barriers to Action
- The landmark Paris Agreement

Mitigation and adaptation are not alternatives; both need to be pursued actively and in parallel.
Uncertainties associated with climate change and its impact, as well as societal responses, mean that adaptation is necessarily an iterative process.

2019
How do we integrate adaptation to relevant socioeconomic and environmental policies and actions?

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The landmark Paris Agreement

The balance between adaptation and mitigation in terms of finance was still nonexistent.
NBS have an important role to play in the post-COVID19 recovery phase.

Do we need to adapt?
How do we adapt?

1994
2019
How do we integrate adaptation to relevant socioeconomic and environmental policies and actions?
Mitigation is constrained into the present, adaptation on the other hand has to deal with the present conditions and future scenarios.

In a real world application one cannot dissociate or draw a clear line of separation between CC and anthropogenic effects.

Soil restoration is the most effective ecosystem restoration water NBS as these are capable of ensuring water supplies, moderating extreme events, controlling erosion and purifying water.

One cannot simplify or undermine the scientific and technical principles behind engineering. In fact, the principles and metrics behind grey solutions are often absent in the case of NBS and EbA, unlike grey solutions.

UN Decade on Ecosystem Restoration 2021-2030 spearheaded by the UNEP which gave NBS a very significant role in this decade.
5. International scale

What should we know? The other side of the coin

Maladaptation  Complexity of adaptation science  Scalability  Wrong attributions

Uncertainties  Management and perpetuity  Specificity  Lack of awareness

Disservices  Privileging urban environments  Contested definitions

A lack of operational clarity

Feedback loops

Absence of sound scientific evidence

Disconnection between short-term actions and long-term goals

Data timeline

Adaptive management/governance is still missing in the NBS framework
6. Perspectives and open-ended questions

1- Deriving research needs for effective mainstreaming of NBaS

2- Can NBaS occupy this position?

3- Should NBaS withstand climate or weather change?
Contact and information

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