Sustainable Use of Land and Nature-Based Solutions Partnership

Better regulation to boost NBS at European, national and local level (ACTION N6)

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****The Pact of Amsterdam states that the Action Plan "can be regarded as non-binding". Therefore, the actions presented in this Action Plan are not compulsory.****

TABLE OF CONTENTS

Contents

1 Introduction

In the context of Action 6 **Better regulation to boost NBS at European, national and local level** this deliverable focus on the local regulation and in particular it referes to the need of better integrate NBS and ES concepts into local planning and policies. This action works under the 'better regulation' umbrella.

Improving local policies and plans to better implement NBS and sustainable land use decision in cities has been considered as one of the main priorities of the partnership since the very beginning of the work in 2017.

In this regard, this report presents a very simple methodology to assess the integration of ES and NBS into local policies and plans and include the results of such an assessment in the municipality of Bologna, co-coordinator of the partnership and case study of this action.

Ideally, the methodology will be further applied locally to all the cities of the partnership and beyond in case they would like do self-assessment of NBS and ES integration into their policies and to better understand how and into which policies and plans they should focus their attention.

2 Method to assess NBS and ES into local policies and plans

To better integrate the concept of NBS and Ecosystem Services into local policies and planning instruments and tools, each city should first of all define its own baseline, main needs and objectives to be achieved and the tools to reach them. This chapter presents a step by step methods to allow cities to perform a self-assessment of NBS and ES integration in their plans.

To understand the degree of inclusion of Urban Ecosystem Services (UES) and Nature Based solutions (NBSs) in urban policies and plans a three-step process can be followed as described in the three-following subchapter:

- Definition and selection of UES pertinent for the Bologna case (2.1)
- Selection of local policies, plan and strategies potentially relevant for UES (2.2)
- Qualitative content analysis of selected local policies, plan and strategies (2.3)

2.1 Definition and selection of UES pertinent for the selected case:

As introduced by the Millennium Ecosystem Assessment (ME Assessment, 2005) the Ecosystem Services framework aimed at defining and quantifying those interactions and relations as benefits or trade-off that people obtain from ecosystems. Narrowing this framework at city level, several urban ecosystem cross our cities: street trees, lawns/parks, urban forests, cultivated land, wetlands, lakes/sea, and streams (Bolund and Hunhammar, 1999). Each city should first of all map its Urban Ecosystem to better understand where and how much green is available in their city. Secondely each city should define relevant Urban Ecosytem Services for its territory. Selection of such UESs can be discuss with local stakeholders to range the importance of teh UESs and better understand which are the priorities in each city.

Figure 1 reports the 17 goups of ES listed by Costanza et al. (1997) that can be used for the selection.

Table 1 Ecosystem services and functions used in this study

Number	Ecosystem service*	Ecosystem functions	Examples
1	Gas regulation	Regulation of atmospheric chemical composition.	CO_2/O_2 balance, O_3 for UVB protection, and SO_x levels.
2	Climate regulation	Regulation of global temperature, precipitation, and other biologically mediated climatic processes at global or local levels.	Greenhouse gas regulation, DMS production affecting cloud formation.
3	Disturbance regulation	Capacitance, damping and integrity of ecosystem response to environmental fluctuations.	Storm protection, flood control, drought recovery and other aspects of habitat response to environmental variability mainly controlled by vegetation structure.
4	Water regulation	Regulation of hydrological flows.	Provisioning of water for agricultural (such as irrigation) or industrial (such as milling) processes or transportation.
5	Water supply	Storage and retention of water.	Provisioning of water by watersheds, reservoirs and aquifers.
6	Erosion control and sediment retention	Retention of soil within an ecosystem.	Prevention of loss of soil by wind, runoff, or other removal processes, storage of stilt in lakes and wetlands.
7	Soil formation	Soil formation processes.	Weathering of rock and the accumulation of organic material.
8	Nutrient cycling	Storage, internal cycling, processing and acquisition of nutrients.	Nitrogen fixation, N, P and other elemental or nutrient cycles.
9	Waste treatment	Recovery of mobile nutrients and removal or breakdown of excess or xenic nutrients and compounds.	Waste treatment, pollution control, detoxification.
10	Pollination	Movement of floral gametes.	Provisioning of pollinators for the reproduction of plant populations.
11	Biological control	Trophic-dynamic regulations of populations.	Keystone predator control of prey species, reduction of herbivory by top predators.
12	Refugia	Habitat for resident and transient populations.	Nurseries, habitat for migratory species, regional habitats for locally harvested species, or overwintering grounds.
13	Food production	That portion of gross primary production extractable as food.	Production of fish, game, crops, nuts, fruits by hunting, gathering, subsistence farming or fishing.
14	Raw materials	That portion of gross primary production extractable as raw materials.	The production of lumber, fuel or fodder.
15	Genetic resources	Sources of unique biological materials and products.	Medicine, products for materials science, genes for resistance to plant pathogens and crop pests, ornamental species (pets and horticultural varieties of plants).
16	Recreation	Providing opportunities for recreational activities.	Eco-tourism, sport fishing, and other outdoor recreational activities.
17	Cultural	Providing opportunities for non-commercial uses.	Aesthetic, artistic, educational, spiritual, and/or scientific values of ecosystems.

*We include ecosystem 'goods' along with ecosystem services.

Figure 1 Ecosystem Services Groups (Costanza et. al. 1997)

The same approach can be followed to narrow down interesting Nature Based Solutions for the urban areas. To identify a catalogue of NBS to further select potentially relevant NBSs, cities can take as a reference the new THINKNATURE handbook published at the end of 2019 (Somarakis, 2019) by the H2020 funded project.

The full handbook with the relevant catalogue of NBSs can be found at this link: https://platform.think-nature.eu/system/files/thinknature_handbook_final_print_0.pdf

2.2 Selection of local policies, plan and strategies potentially relevant for UES

After the selection of relevant UES and NBSs the following step a city should undertake regards the selection of relevant policies.

In this regard, since each Member States has different legislation in terms of city competences, planning normative, etc. the situation can change from case to case and it is hard to provide a unified list of documents to be considered.

Generally, each city should refer at least to local plans and policies in the following sectors:

- climate adaptation
- greening and biodiversity
- environmental policies (i.e air pollutions, etc,)
- mobility

- urban planning instruments and tools
- building codes
- marine strategy
- national, regional, local parks related policies
- quality of life, people wellbeing and health
- any other relevant policy

The main objectives of this step are to identify all potentially relevant policies to be assessed in respect to UES and NBSs. The list can vary a lot from place to place and considering the different scale of the city in terms of population and area of influence.

2.3 Qualitative content analysis of selected local policies, plan and strategies

The last step of the proposed method regards the UES and NBS analysis into the selected policies and plans. This approach can be considered a simplified version of more in depth possible analysis that could make use of further and more precise quantitative data analysis.
In this proposed approach the first step would be to look for explicit reference to the UES or NBSs framework within the analysed documents. Of course, UES categories and NBSs typology should be translated into local languages, in case selected policies and plans are not available in English.

In most of the cases, also due to language reasons, it will be hard to find explicit mention of UES and NBS, and it would be rather easier to look for implicit reference to the topics.
Last, to better understand and assess the potential impact of addressed UES and NBS into policies and plan it is important to classify the measures/actions related with UES and NBS references in terms of type of actions and interventions. The proposed categories of this analysis are:

- awareness raising actions
- infrastructure to be build
- governance/regulation
- financial instruments
- recommendations

This final step should also refer to relevant monitoring strategies related with the analyzed policies and plans. Indeed, understanding which kind of actions are related with UES and NBSs can support a better understanding of the potential effectiveness of such measures, being for instance a recommendation a much softer measure than a binding regulation.

3 The case of the city of Bologna

3.1 Relevant UES in Bologna policies and plans

For the case of Bologna, the following UES have been considered:

- **Regulating services**: air filtering (gas regulation), micro-climate regulation, noise reduction (disturbance regulation), run-off control and water purification (water regulation), pollination
- **Supporting services**: habitat for species (refugia), genetic resources
- **Provisioning services**: food production and fresh water (water supply)
- **Cultural services**: recreational and cultural values (spiritual and educational services).

in total, 14 documents were screened related with climate, greening and planning instruments and tools.

Urban Planning tools

- Municipal Structural Plan (Piano Strutturale Comunale, PSC): The plan was drafted in 2007 and fixes the strategy, limits and conditions to proposed urban changes.
- Municipal Operative Plan (Piano Operativo Comunale, POC): The plan assigns building capacity to the areas subjected to new developments and urban renewal.
- Building and Urban Code (Regolamento Urbansitico ed Edilizio, RUE): The code defines rules for building interventions and assigns specific volumes to the defined areas, in respect of the limits and conditions defined by the PSC.

Climate policies

- The Action Plan for Sustainable Energy (SEAP), which defines actions to increase energy efficiency and use of renewable energy sources in the urban and industrial areas, focusing on construction industry, service sector, local production of energy, mobility and public facilities.
- The Climate Adaptation Plan (CAP), the first to be approved in Italy, defines targets, actions and monitoring to support climate adaptation of the city.
- The Sustainable Urban Mobility Plan (SUMP) that introduces important measures in terms of slow and green mobility in the city.

Environmental, Greening and other relevant policies

- Municipal code for public and private green areas, which defines the overall regulations to protect and maintain urban green areas (parks, street trees, etc.).
- Guidelines for green public areas development
- Nature for children, as a specific document which supports the development or regeneration of existing green areas in schools and kindergartens.
- Urban farming and orchards Code, which defines, promotes and regulates public orchards in the city.
- Regulation on Public Collaboration for the Urban Commons is the pact of collaboration, through which the city and citizens (informal groups, NGO's, private entities) agree on an intervention of care and regeneration of urban commons (green space, abandoned buildings, squares).

58 relevant mentions have been found, referring to all the 4 UES categories and covering a wide range of potential actions and recommendations. The most recurrent category concerns regulating services (32) –generally related with micro-climate regulation and water run-off control- followed by cultural services (19) in terms of recreational activities. Provisioning and supporting services are mentioned just 7 times, generally referring to food production and habitat for species.

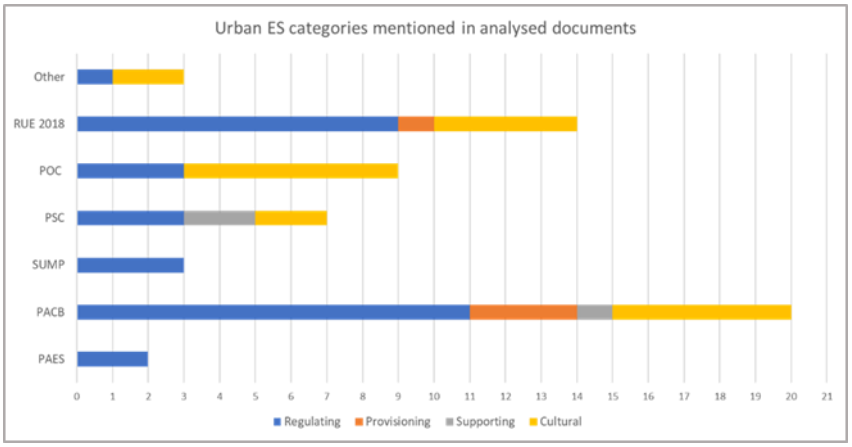

Figure 2 UES categories mentioned in Bologna policies and plans (de luca et. al, forthcoming)

3.2 Type of action related with UES

The study attempted to categorize the actions related with the UES presented in paragraph 3.1. The definition of the categories hereby presented arose from a qualitative content analysis and from informal interviews with city officers.

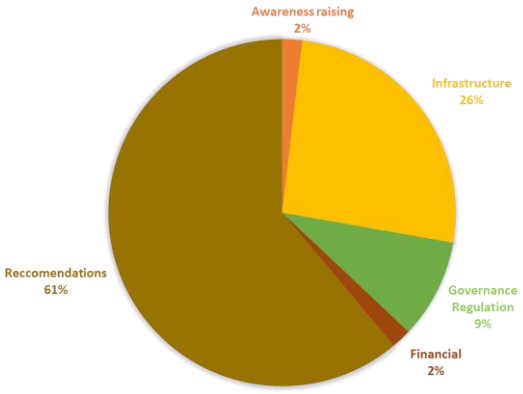

Figure 3 Categories of actions including UES in the analysed document (de Luca et al. Forthcoming)

Fig 3 illustrates that most of the UES actions (61%) are expressed in the form of recommendations, i.e developers *should* include green roof, *should* improve accessibility, etc. Actions defined as infrastructures (26%) include concrete projects that the city will develop. Under governance/regulation definitions of binding parameters were included, including for instance urban standards for new developments. Just one action includes public financing scheme concetning agriculture funds for adaptation to climate change. Last, there is one action on awareness raising, which refers to the Green-Up campaign on climate change and adaptation.

Bologna, a quite compact city in the centre and first suburbs is facing challenges in introducing and building new green areas. NBSs represent a huge opportunity for Bologna and many other compact cities in Europe considering the wide range of different solutions – i.e. green roofs, green walls, green shelters, etc., - they offer and the way they could be further integrated into local policies and plans. It is then critical to work on green urban regeneration, through greening of existing buildings, urban voids, and demolition and construction opportunities. In this sense the city is now working on the development of the new City Master Plans (Piano Urbanistico Generale) that represents a huge occasion to integrate UES and NBSs into new strategies, plans and visions.

4 Conclusion

Cities around Europe are struggling in understanding how to make themselves greener and more liveable. Most of EU cities are already compact and densely populated and are starting to reflect about how to increase NBSs into their urban areas. Also, in some cases, cities' administration doesn't have the economic capacity to develop and maintain new green in their urban areas.

For this reason, it is crucial for cities to introduce planning standards, recommendations, financial incentives or awareness raising actions to induce public and private local stakeholders to develop, build and maintain more and more green areas into the city. To do so, it is then critical to mainstream NBS into local policies and plans.

Within the broader context of Action 6, this report presents a simple and easy-to-apply method to analyse the degree of integration of NBSs and related UES and into local plan and policies. Indeed, this would be the first step to understand what a city already included in its plans and what is still missing and should be further improved. This method has been applied and tested to the city of Bologna, co-coordinator of the Partnership by the University of Bologna, leader of this Action. The results of the analysis provided useful insights and recommendations for further policies and plans' development of the cities.

All the cities of the partnership and beyond are invited to perform this easy step-by-step method to analysis NBSs and related UESs into their policies and plans to redirect their work based on the results of such analysis.

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