

## Review of Economic Valuation of Nature-based Solutions in Urban Areas



### KEY POINTS

- NBS are important for addressing contemporary urban challenges
- An important obstacle to implementing NBS is that they are not properly priced
- Environmental economics offers a number of methods to obtain the value of NBS and its services
- Database collected and described within this project provides a palette of NBS values and its services

### ABOUT THE PROJECT

NATURE-based URban inNOVATION is a 4-year project involving 14 institutions across Europe in the fields of urban development, geography, innovation studies and economics. We are creating a step-change in how we understand and use nature-based solutions for sustainable urbanisation.



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## Recognising the Economic and Financial Value of Nature-based Solutions

Due to climate change and high degree of urbanisation contemporary cities are developing significant environmental problems that can have an array of negative effects on societal well-being. Given that more than a half of the world's population, and around three quarters of EU population lives in cities, this is becoming an ever more pressing challenge requiring urgent solutions at scale. Nature-based solutions offer one approach. Nature-based solutions are actions inspired by, supported by, or copied from nature. They can use and enhance existing natural assets, as well as exploring more novel solutions (European Commission, 2015). They are positive responses to societal challenges, and can have the potential to simultaneously meet environmental, social and economic objectives. Essentially, nature-based solutions is an overarching concept that builds on, and supports, other closely related concepts, such as the ecosystem approach, ecosystem services, ecosystem-based adaptation and mitigation, green engineering and green and blue infrastructure.

### *Valuing Nature-based Solutions*

However, while nature-based solutions appear to be a promising means for addressing current urban environmental challenges, their application is often hampered. One issue is that while their benefits are recognised, their economic value is not attributed. As a consequence, benefits provided by nature-based solutions are difficult to assess and consequently to compare to other costs/benefits of alternative solutions,



and are often underappreciated. The absence of monetized value of nature thus leads to a number of less than optimal outcomes, such as the under-provision of nature in urban areas where space is scarce.

Difficulties associated with valuing open spaces in monetary terms are connected to the fact that nature and its attributes and services for urban populations are not goods directly traded in the market. Therefore, in order to obtain quantified values of nature-based solutions there is a need to use proxies to estimate these values. The literature traditionally distinguishes between direct and indirect methods. Direct methods establish the value of non-traded goods and services using survey instruments that collect data on stated preferences for nature. Indirect methods rely on prices of related goods observed in real markets (e.g. house prices) and derive monetary values from these values. However, these methods are not always used because



they are costly and time-consuming and there may be a lack of market data to analyse. An alternative benefit transfer method works by applying values to a specific situation or good that are borrowed from a different place or in a different context. Meta-analysis of existing studies that have mapped the values of nature-based solutions provides a suitable basis for this approach. In order to include the economic values of nature-based solutions within the NATURVATION project we have reviewed existing literature and created a novel database that records the financial and economic values of nature-based solutions.

### *Creating the Financial and Economic Value Database of Nature-based Solutions*



The NATURVATION Financial and Economic Value Database includes monetary values of nature-based solutions together with respective sources and methods by which these values were obtained. It

also facilitates the transdisciplinary approach of the project by fostering learning and collaboration across different knowledge communities to develop a new analytical perspective on urban nature-based solutions.

The literature review of economic valuation studies that underpins the database offers an evidence base for deriving economic values of nature-based solutions derived from a selection of studies of economic values of nature in urban areas. These values were estimated with methods that are widely used in the discipline of environmental economics which encompass the broad range of economic value typologies from use and non-use values. It provides an important addition to the literature by gathering academic studies which have developed quantification and monetisation of nature and its benefits in an urban context in relation to specific nature-based solution domains and functions. Our selection reveals a large variability in services valued and metrics used in expressing the values of nature and its services. This is mainly due to differences in the valuation methods used and purposes served by each individual study. This heterogeneity hampers the degree of comparison between and across studies that is possible. Nonetheless this review report and database provide an overview of a palette of values attached to urban nature, valued at various circumstances, and for different purposes, which can subsequently be used for benefit transfer purposes.



### *Using the Financial and Economic Values Database*

The database uses the framework adopted by the NATURVATION project to categorise nature-based solutions in terms of their goals, domains and ecosystem services. The sources include academic papers published on economic valuation of NBS in the last 40 years. The FEVD includes 205 value entries for NBS originating from 105 studies with a broad geographical coverage. It covers both revealed preference stated preference methods, and include values elicited by means of contingent valuation and choice modelling (SP), as well as hedonic pricing and benefit transfer methods (RP).

Economic values of urban nature present in the database cover a variety of landscapes, goals and services. In terms of landscapes, most values are attributed to the landscapes of parks, woods and farms, as well as to water environments. Ecological domains include urban parks and (semi)natural urban green areas, blue areas, peri-urban open space areas and external building surfaces which have been planted. Valued services are mainly: (i) regulating services, including local climate regulation, air quality regulation, noise reduction, carbon storage and water purification; and (ii) cultural services, including recreation, tourism and aesthetics. The goals targeted by interventions include: environmental quality; green spaces; and health and well-being. Agents involved in nature valuation are individuals, households and area-based communities.

### *Next steps*

The meta-analysis to be conducted later on in the project aims to estimate benefit transfer function for specific NBS types and services. We are confident that this will be possible with a more detailed categorization of studies in the current database in terms of aggregated domains, such as green and blue infrastructure. However, it remains to be seen whether sufficient individual estimates per function exist for making a reliable link between values and functions for several nature-based solution types.

