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Deliverable D6.18

MOOC final

Final version of the MOOC „Nature-based Urban Regeneration“ on the global e-learning platform edX

Work package: 6
Task 6.3 MOOCs
Dissemination level: public
Lead partners: RWTH
Author: Margot Olbertz
Due date: 2023/11/30
Submission date: 2023/11/30

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| Deliverable | MOOC final version MOOC „Nature-based Urban Regeneration“ on the global e-learning platform edX |
| Deliverable No. | 6.18 MOOC final |
| Work Package | 6, Task 6.3 |
| Dissemination Level | PU |
| Author | Margot Olbertz (RWTH) |
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| Date | 2023/11/30 |
| File Name | D6.18_MOOC_Nature-based urban regeneration_final_RWTH |
| Status | |
| Revision | |
| Reviewed by (if applicable) | Axel Timpe (RWTH) |
| Information to be used for citations of this report | MOOC final "Nature based Urban Regeneration" RWTH, Del. 6.18, proGReg, Horizon 2020 Grant Agreement No 776528, European Commission, page numbers 18. |

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This project has received funding from the EU's Horizon 2020 research and innovation programme under grant agreement no. 776528.

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This work was financially supported by the National Key Research and Development Programme of China (2017YFE0119000).

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Document revision history

| Version | Date | Modification reason | Modified by |
|---------|------|---------------------|-------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
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Partner organisations

| No. | Name | Short name | Country |
|-----|--|------------|---------|
| 1 | Rheinisch-Westfälische Technische Hochschule Aachen | RWTH | Germany |
| 2 | Fachhochschule Süd-Westfalen | SWUAS | Germany |
| 3 | Fondazione della Comunita die Mirafiori Onlus | MIRAFIORI | Italy |
| 4 | Politecnico di Torino | POLITO | Italy |
| 5 | Stadt Dortmund | DORTMUND | Germany |
| 6 | Die Urbanisten EV | URBA | Germany |
| 7 | Comune di Torino | COTO | Italy |
| 8 | Orti Generali | | Italy |
| 9 | Associazione Orti Alti | OA | Italy |
| 10 | Ningbo Municipal Center for Forestry Science & Technology Services | IUE-CAS | China |
| 11 | ICLEI European Secretariat GmbH | ICLEI | Germany |

| | | | |
|----|--|----------|---------|
| 12 | Europäische Föderation Bauwerksbe- grünungsverband | EFB | Germany |
| 13 | Grad Zagreb | Zagreb | Croatia |
| 14 | Udruga Zelene I Plave Sesvete | Zips | Croatia |
| 15 | Parco Scientifico Tecnologico per Lambiente Environment Park Torino Spa | Envipark | Italy |
| 16 | Starlab Barcelona SL | SL | Spain |
| 17 | Fundacion Privada Instituto de Salud Global Barcelona | ISGlobal | Spain |
| 18 | Consiglio Nazionale delle Ricerche | CNR | Italy |
| 19 | Universita delgi Studi di Bari Aldo Moro | Uniba | Italy |

Abbreviations

| | |
|-----------------|---|
| edX: | global e-learning platform |
| FRC: | Front-Runner Cities |
| LL: | Living Lab |
| MOOC: | Massive Open Online Course |
| NBS: | nature-based solutions |
| proGInreg: | productive Green Infrastructure for post-industrial urban regeneration |
| verified track: | MOOC learners choosing to obtain a course certificate at a fee of 49\$ |
| GoGreenRoutes: | GO GREEN: Resilient Optimal Urban natural, Technological and Environmental Solutions' |

Executive summary

The Massive Open Online Course (MOOC) “**Nature based Urban Regeneration**” as part of WP6, Task 6.3: EdX MOOC training module with global outreach represents a comprehensive synthesis of methods developed and applied in the proGReg Living Labs of the four Front-Runner Cities (FRC) and key outcomes. Available on the leading global e-learning platform edX, it guarantees wide dissemination of nature-based solutions (NBS) applications and its implications for knowledge transfer and spreading awareness among a global multi-disciplinary audience of the potential transformative agency of NBS.

Led by RWTH Aachen University, several proGReg experts from universities, research institutions, municipalities, NGOs, industry and practitioners, and GOGreen project partners have contributed to the MOOC. Designed as 6-week course, the final version of the MOOC summarizes the findings of exploring and implementing innovative NBS in proGReg’s FRC in Europe and China in their need to transform cities and neighbourhoods into more sustainable and liveable environments for enhancing quality of life. NBS have been tested to evaluate their viability and to develop replicable methodologies and approaches in proGReg Living Labs (LL). The MOOC showcases how cities are harnessing NBS for green transformation processes, together with local communities. The course provides theoretical and practical knowledge on how to set up a nature-based urban regeneration strategy, evaluate the impacts of NBS and develop sustainable business models. The addition of a 6th module by the EU H2020 project GO GREEN: Resilient Optimal Urban natural, Technological and Environmental Solutions’ for the 2nd run complements and expands on NBS benefit assessment content of the impact of NBS on health and wellbeing, introducing different approaches and NBS implementations.

This report provides an overview of the changes made for the final version of the MOOC. Latest results elaborated in 2023 in WP5, Task 5.3: Integrating NBS into business models and business model catalogue creation (SWUAS) of developing a Business Model Catalogue for NBS and the analysis of sustainable business models for NBS based on the experiences from the Living Labs has been added in several units of Module 5.

The start of the MOOC’s final version as a self-paced course on November 29th 2023 has been communicated through various EU, proGReg and other institutional channels, social media and edX. Survey results of the two previous course runs highlighted learners’ preference for a self-paced course format allowing for more flexible manageability of the workload. Given many learners are professionals seeking to gain and/or deepen their expertise in designing with NBS, more flexible time management to finish all tasks will meet learners’ requirements.

The MOOC will be available on the e-learning platform edX as a self-paced course for approx. five years beyond proGReg’s project end.

Explore the course on [edX](#) and watch the [trailer](#).

1. Introduction

1.1. Introduction to the proGReg project

Productive Green Infrastructure for post-industrial urban regeneration (proGReg) is developing and testing nature-based solutions (NBS) co-creatively with public authorities, civil society, researchers and businesses. Eight NBS, which will support the regeneration of urban areas affected by deindustrialisation, have been implemented or are going to be deployed in four front-runner cities: Dortmund (Germany), Turin (Italy), Zagreb (Croatia) and Ningbo (China). The follower cities of Cascais (Portugal), Cluj-Napoca (Romania), Piraeus (Greece) and Zenica (Bosnia and Herzegovina) in the meantime receive support in developing their strategies for improving nature-based solutions at local level through co-design processes. The NBS to be tested are:

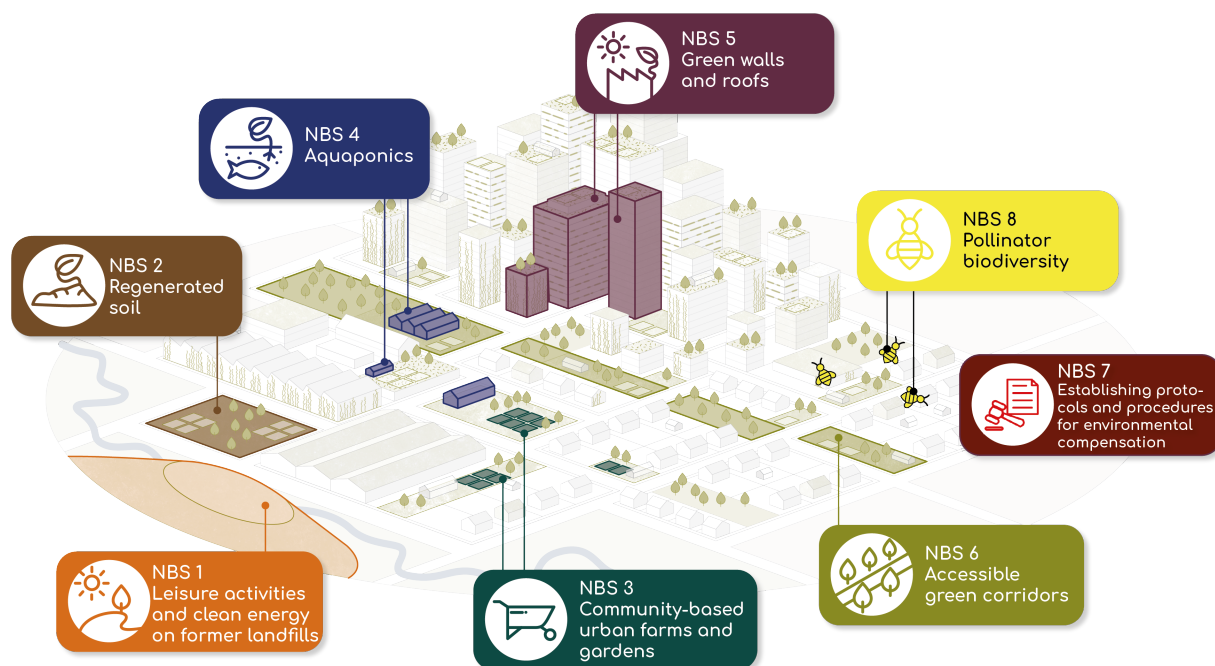


Figure 1 Spatial representation of proGReg NBS (RWTH)

- NBS 1: Renaturing landfill sites for leisure use and energy production
- NBS 2: New regenerated soil thanks to biotic compounds for urban forestry and urban farming
- NBS 3: Community-based urban farms and gardens
- NBS 4: Aquaponics
- NBS 5: Green walls and roofs
- NBS 6: Making post-industrial sites and renatured river corridors accessible for local residents
- NBS 7: Establishing protocols and procedures for environmental compensation at local level
- NBS 8 - Pollinator biodiversity improvement activities and citizen science project

1.2. Task 6.3 EdX MOOC training module with global outreach

Led by RWTH, the objective of Task 6.3 (M18-M60) is to develop and produce a Massive Open Online Course (MOOC) covering the topic of “Nature-based urban regeneration” with global outreach. The MOOC aims at distributing methods developed and results of the proGlgreg project as a long-term open-source training content offered via the global platform edX and fosters knowledge transfer outside of the project.

2. ProGlgreg MOOC “Nature Based Urban Re-generation”

The MOOC summarizes the findings of exploring and implementing innovative nature-based solutions (NBS) in proGlgreg’s Front-Runner Cities (FRC) in Europe and China in their need to transform cities and neighbourhoods into more sustainable and liveable environments for enhancing quality of life. NBS have been tested to evaluate their viability and to develop replicable methodologies and approaches in proGlgreg LLs. The six-week MOOC showcases how cities are harnessing NBS for green transformation processes, together with local communities. The MOOC provides theoretical and practical knowledge on how to set up a nature-based urban regeneration strategy, evaluate the impacts of NBS and develop sustainable business models.

For the 2nd run of the course, the EU H2020 project GoGreenRoutes contributed a 6th module. Based on its health and well-being focus, the added module complements and expands on proGlgreg’s WP4 NBS benefit assessment content by highlighting the impact of NBS on health and well-being, introducing different approaches and NBS implementations.

2.1. Updated MOOC content

Table 1 gives an overview of the weekly schedule and topics covered in the MOOC’s final version “Nature Based Urban Regeneration” by modules, units, containing the additional module 6 added for the 2nd run.

Table 1 Overview of the MOOC’s final structure and content. Updates indicated by dotted line

| Module | Units |
|--|---|
| Module 1 The challenges of urban regeneration and the potential of NBS | Unit 1: Post-industrial cities in transformation Unit 2: When industries leave: The cases of Dortmund and Turin Unit 3: Transformation and growth: Zagreb and Ningbo Unit 4: What are NBS? definitions, principles, benefits Unit 5: Integrating NBS in wider regeneration approaches |
| Module 2 The city as a Living Lab for co-creating NBS | Unit 1: Living Labs as transdisciplinary innovation formats Unit 2: Contextualising Living Labs to prepare co-creation Unit 3: Co-creation: Engaging local communities Unit 4: Co-creation in cities: proGReg Living Lab Turin Unit 5: Co-creation in cities: proGReg Living Labs Dortmund and Zagreb |
| Module 3 Productive solutions using nature for renewal | Unit 1: The most important principles in nature-based urban regeneration Unit 2: New urban soils Unit 3: Urban Agriculture Unit 4: Aquaponics Unit 5: Green roofs and walls |
| Module 4 NBS benefits and how to assess them | Unit 1: Introduction to NBS benefit assessment Unit 2: “assessment domain – Environmental and ecological benefits” Unit 3: “assessment domain – Social benefits” Unit 4: “assessment domain – Human health and well being” Unit 5: “assessment domain – Economic and labor market benefits” |
| Module 5 5a) Sustaining NBS: overcoming barriers and creating business models 5b) Upscaling NBS | Unit 1: Overview of potential technological and non-technological barriers Unit 2: Overcoming barriers Unit 3: Integrating NBS into self-sustained business models Unit 4: Examples of business models Unit 5: Upscaling strategies for regional and city-to-city level knowledge transfer |
| Module 6 Promoting Health and Well-being in cities through NBS interventions | Unit 1: NBS for Health and Well-Being Unit 2: Increasing Green Space will improve Urban Health Unit 3: Green Space: Physical health benefits and how to assess them Unit 4: The Human Element of Nature Unit 5: Co-creating Seedbed Interventions: Preparing for NBS |

Based on the work carried out in WP5 Task 5.3: Integrating NBS into business models and business model catalogue creation (SWUAS) three units of module 5 have been updated and adapted to the latest results about sustainable business models for NBS, its analysis tools and the development of the Business Model Catalogue with reference to the web-based iBMC tool. Table 2 shows changes made for the MOOC’s final structure to update and improve the learner experience.

Table 2 Content changes for the MOOC’s final structure by module and unit

| Content changes and additions by module and unit | | |
|--|--|---------------------|
| Module 5 | Unit 3 Integrating NBS into self-sustained business models | Slight modification |

| | | |
|--|--|--|
| | Unit 4 Examples of business models | New recording with updated data on sustainable business models for NBS and the business model canvas and Pestoff triangle analysis |
| | Unit 5 Upscaling strategies for regional and city-to-city level knowledge transfer | New recording based on WP5 results on the business model catalogue and upscaling/replication potential |

2.1. MOOC syllabus

The following pages present the final MOOC syllabus containing key course information for the learners available on the edX course about page and all other communication channels. It provides a structured overview of relevant course info, topics covered, learning outcomes, target groups, type of exams/assignments, grading etc.



Interested in learning about using nature to improve life in our cities? You want to learn how to co-create nature-based solutions with local communities, how to make environmental, economic and social benefits of NBS measurable and translate these into sustainable business models? This course will equip you with the knowledge to set up your own nature-based regeneration strategy!



COURSE CONTENT

Cities around the world are seeking new, greener ways to transform former industrial districts. These areas suffer from social and economic inequalities, lack of green spaces and are significantly more vulnerable to climate change effects and natural hazards. Nature-based solutions (NBS) can contribute to improving environmental quality, social life and local economies in urban areas.

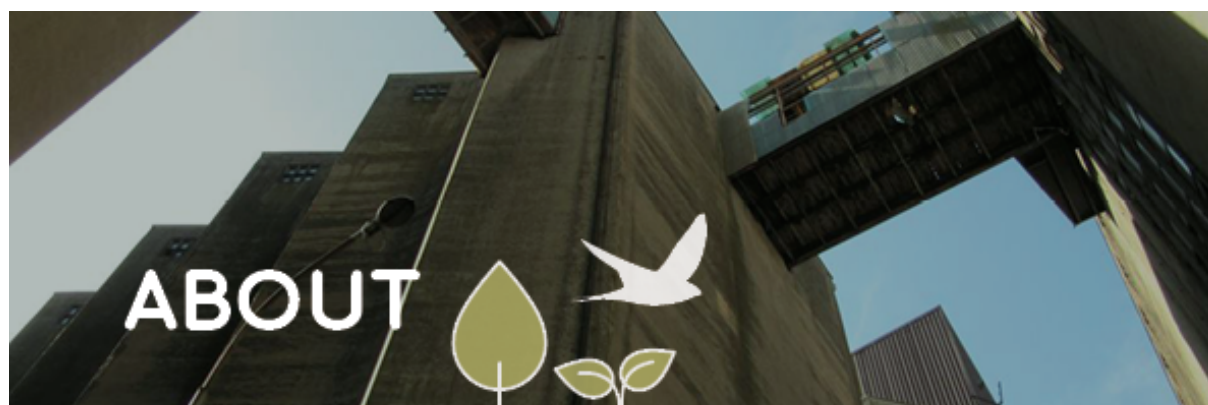
This course will show you how co-creating NBS can transform post-industrial deprived, neglected and abandoned areas into liveable and productive green urban environments, with empowered local communities and thriving local economies.

You will learn about different types of NBS and how they can be implemented in varied local contexts. The course delves into citizen engagement, alongside municipalities, private sector companies, NGOs and academia, as this supports long-term sustainability of NBS. Engagement strategies place emphasis on the inclusion of marginalised and vulnerable groups. The NBS explored in the course showcase the co-benefits to circular economy, urban food production and climate change adaption. You will learn how to measure the effects of NBS on environmental quality, human health and well-being, socio-cultural inclusiveness, local economy and labour market, and how to apply scientific methods to monitor and assess them. Having measurable NBS benefits helps developing successful business models for NBS implementation and management, and supports sound decision- and policy making.

The course draws on research results from Living Labs in European cities where innovative nature-based solutions have been developed and tested under the umbrella of the EU Horizon 2020 funded project proGfreg (productive Green Infrastructure for post-industrial urban regeneration) and GoGreenRoutes.

The course will guide you in setting up a nature-based regeneration project suited to your local context. The methods you will learn entail NBS co-design, co-implementation, benefit assessment and sustainable business models.

Join us as you start on your journey towards inclusive urban regeneration by using nature for renewal!



THIS COURSE PROVIDES

1. **Knowledge** for designing NBS in post-industrial urban regeneration and NBS benefit assessment and monitoring methodology in four domains.
2. **Journeys to 'Living Labs'** – proGReg test sites in cities across Europe - to explore the dynamics of co-creation of NBS in action!
3. **Applications** of how to assess and overcome technological and non-technological barriers in integrating NBS, how to develop and upscale self-sustained business models to achieve sustainable and productive green infrastructure.

We have developed an attractive and challenging course for you. We hope by the time you finish the course you will be inspired to embrace an inter- and transdisciplinary nature-based urban regeneration approach to achieve liveable and productive spaces. NBS have great potential to transform underused spaces into productive and co-owned public places, delivering economic benefits and services to strengthen local communities.

WHAT YOU'LL LEARN

Theory and practice of nature-based urban regeneration:

- defining the potential of nature-based solutions for urban regeneration
- leading co-creation processes for developing multi-scale and context-specific green infrastructure with citizens and other local stakeholders
- applying methods to monitor and assess NBS benefits
- identifying technical and non-technical barriers to NBS implementation and learning how to over-come them
- developing sustainable business models for NBS in urban regeneration
- building your own nature-based urban regeneration project



WEEK 1: The challenges of urban regeneration and the potential of NBS

The first module introduces you to the challenges of urban regeneration and the potential of NBS in transforming post-industrial cities, including the integration of NBS into wider re-generation approaches

→ [Assignment 1](#)

WEEK 2: The City as a Living Lab for co-creating NBS

Module 2 provides methods and examples of context-specific analysis and locally adaptable trans-disciplinary innovation formats to engage local communities in developing liveable urban environments

→ [Assignment 2](#)

WEEK 3: Productive solutions using nature for renewal

This module presents applications of different types of productive nature-based solutions in detail incl. NBS urban agriculture, aquaponics and green roofs and walls

→ [Assignment 3](#)

WEEK 4: NBS benefits and how to assess them

The fourth module introduces you to methods of monitoring and assessing a range of NBS benefits for society, economy and the environment

→ [Assignment 4](#)

WEEK 5: Sustaining NBS: overcoming barriers, creating business models and upscaling NBS

This module shows how to overcome barriers in NBS implementation and to create business models for productive green infrastructure to allow NBS upscaling to city level.

→ [Assignment 5](#)

WEEK 6: Health and well-being impact of NBS

Module 6 shows in-depth how NBS impact urban health by using different assessment, risk + modelling methods and approaches to strengthen human-nature relationships.

→ [Final Assignment](#)



TIME COMMITMENT

This course runs over 6 weeks. You will spend approximately 5-6 hours per week incl.:

- watching lecture videos
- exploring literature and website recommendations, toolboxes etc.
- completing recap questions (quiz)
- completing assignments
- participating in the discussion forum

Please keep all deadlines for the verified track in mind towards the end of the course so you hand in everything on time to receive your certificate.

GET READY FOR THE QUIZ AND ASSIGNMENTS

Quiz questions

After watching each unit's lecture video, please answer a series of questions revising what you've learned.

Assignments

Learners who want to receive a certificate for this edX course have to complete recap questions, the last four module assignments and a final assignment. Each module concludes with an assignment, the final assignment starts at the end of module 6.

Final assignment

Your assignments over the course of six modules provide the building blocks and bringing them together for writing your project proposal of a nature-based urban regeneration strategy.

GRADING

Your assignments will be graded by peer reviews.

The final grade is calculated as follows:

10% Recap Questions, 40% Assignments and 50% Final Assignment

To receive a certificate, participants need to obtain at least 60% of the total points.



NATURE-BASED URBAN REGENERATION



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This project has received funding from the EU Horizon 2020 research and innovation programme under grant agreement no. 776528

This work was financially supported by the National Key Research and Development Programme of China (2017YFE0119000)

2.2. MOOC video material by module/unit and YouTube links

Each unit is accessible to watch via the You Tube links provided in Table 3. To view videos, please **copy the YouTube link and insert in www.youtube.com or click on the link.**

Table 3 MOOC modules and units incl. YouTube links

| RWTH proGReg MOOC sub-titled videos | |
|--|---|
| module / unit | YouTube Link |
| Module 1 - The challenges of urban regeneration and the potential of nature-based solutions | |
| Unit 1: Post-industrial cities in transformation | https://www.youtube.com/watch?v=AfEXvf2EnUc |
| Unit 2: When industries leave: The cases of Dortmund and Turin | https://www.youtube.com/watch?v=nGabBV4x0nY |
| Unit 3: Transformation and growth: Zagreb and Ningbo | https://www.youtube.com/watch?v=X7CVdTZHciA |
| Unit 4: What are NBS? definitions, principles, benefits | https://youtu.be/_FxAhDUofV4 |
| Unit 5: Integrating NBS in wider regeneration approaches | https://www.youtube.com/watch?v=0ZeFMUITzfo |
| Module 2 - The city as Living Lab for co-creating NBS | |
| Unit 1: Living Labs as trans-disciplinary innovation formats | https://youtu.be/knOUPnuQ5ek |
| Unit 2. Contextualising Living Labs | https://www.youtube.com/watch?v=TY_i7VcGeqw |
| Unit 3: Co-creation: Engaging local communities | https://youtu.be/Ziu_CosGwz8 |
| Unit 4: Co-creation in cities: proGReg Living Labs Dortmund and Zagreb | https://www.youtube.com/watch?v=gfarYNC07Ew |
| Unit 5: Co-creation in cities: proGReg Living Lab Turin | https://youtu.be/iMFFOjd_qtl |
| Module 3 – Productive solutions using nature for renewal | |
| Unit 1: Applied nature-based urban regeneration | https://www.youtube.com/watch?v=F2XmhqP0sh4 |
| Unit 2: New urban soils | https://www.youtube.com/watch?v=u1Nv2mfjAA8 |
| Unit 3: Urban Agriculture | https://www.youtube.com/watch?v=rPm6rP-TXWs |
| Unit 4: Aquaponics | https://www.youtube.com/watch?v=j6DkX3z198Y |
| Unit 5: Green roofs and walls | https://www.youtube.com/watch?v=aSexf8RKcho |
| Module 4 -NBS benefits and how to assess them | |
| Unit 1: Introduction to NBS benefit assessment | https://www.youtube.com/watch?v=vDCZIH0ITaQ |
| Unit 2: Assessment domain – Environmental and ecological benefits | https://www.youtube.com/watch?v=U3PgOO3qy-U |
| Unit 3: Assessment domain - social benefits | https://www.youtube.com/watch?v=DwchnYFLfZk |
| Unit 4: Assessment domain - Human health and well being | https://www.youtube.com/watch?v=NjNAtkZ-ffl |
| Unit 5: “assessment domain – Economic and labor market benefits” | https://www.youtube.com/watch?v=pcYx-Rma798 |
| Module 5 - Sustaining NBS | |

| | |
|---|---|
| Unit 1: Overview of potential technological and non-technological barriers | https://www.youtube.com/watch?v=okTwSBM6L-s |
| Unit 2: Overcoming barriers | https://www.youtube.com/watch?v=BpSjHzKitlw |
| 5a) Creating Business models | |
| Unit 3: Integrating NBS into self-sustained business models | https://youtu.be/nTV0uYYnXpM |
| Unit 4: Examples of Business models | https://youtu.be/rCy2yb_zxic |
| 5b) Upscaling NBS | |
| Unit 5: Upscaling strategies for knowledge transfer | https://youtu.be/6Z54QGhd91k |
| Module 6 - Promoting Health and Well-being in cities through NBS interventions | |
| Unit 1: NBS for Health and Well-Being | https://youtu.be/ZUAhdPFhnds |
| Unit 2: Increasing Green Space will improve Urban Health | https://youtu.be/Mhv53UZpq8w |
| Unit 3: Green Space: Physical and Mental Health and How to Assess Them | https://youtu.be/bOUGPUGxZ24 |
| Unit 4: The Human Element of Nature | https://youtu.be/PVgc1hr7vqg |
| Unit 5: Co-creating Seedbed Interventions: Preparing for NBS | https://youtu.be/YGPzG4nV_HQ |