

A Massive Open Online Course

RECONNECT MOOC

Deliverable D6.5



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Abstract (for dissemination, 100 words)	Deliverable D6.5 provides a description, formation and the results from developing a MOOC to disseminate the findings from the RECONNECT project. The MOOC, unlike others, was targeted at non-academics; researchers, practitioners, and policy makers. The six modules brought together expertise from the entire RECONNECT consortium. This depth of knowledge helped cover all aspect of NbS and provide participants with critical knowledge and skills to identify adequate NbS and estimate their effectiveness to cope with potential hydrometeorological hazards. To make the learning environment more creative/interactive/engaging, rather than using ppt, SCORMS were created. The platform used for the MOOC enabled a variety of learning methods.
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Executive Summary

Deliverable D6.5 provides a description, formation and the results from developing a MOOC to disseminate the findings from the RECONNECT project. The MOOC, unlike others, was targeted at non-academics; researchers, practitioners, and policy makers. The six modules brought together expertise from the entire RECONNECT consortium; IHE Delft, the Universitat Hamburg, University of Belgrade, Ramboll, Helmholtz-Zentrum fuer Umweltforschung, Danmarks Tekniske Universitet, Amphi, eawag, TAUW, Municipality of Odense, EUROSENSE, GISIG and UNEXE. This depth of knowledge helped cover all aspect of NbS and provide participants with critical knowledge and skills to identify adequate NbS and estimate their effectiveness to cope with potential hydrometeorological hazards. To make the learning environment more creative/interactive/engaging, rather than using ppt, SCORMS were created. The platform used for the MOOC enabled a variety of learning methods from flip cards to hot spot images and features such as youtube clips and articles from journals were embedded for automatic download. Direct links to websites i.e. to NBS tools, podcasts, RECONNECT webinars, news articles and data sources were also embedded. Participants were assessed using an assortment of different styled assessment/questions these included; card sorting, fill in the blank, multiple choice, text matching, open ended, true or false, ranking and single choice. To pass a module participants needed to gain 90%, once achieved they would be granted access to the next module and so on and so forth. The feedback and initial results show that the RECONNECT MOOC was a success with an initial sign up of 303 students, 166 participants officially started the MOOC on the 16/09/2024 with only 9 drop outs, and 20 participants completing within the 6 weeks (16/10/2024). Feedback included:

Consultant working in National Government in Romania: it was an extraordinary learning experience.

Environmental/Engineering Consultant in Switzerland: I think it's a great MOOC, that's the perfect amount of technical information and a great overview of a large topic

Environmental/Engineering Consultant in Colombia: I really think that this course helped me by giving me the knowledge that i need for the current project that I'm working on. I thinks its very important to me the opportunity of having access to free education and not seeing money as a limit, because i really imagine my professional life as a chance for building a change and this course encouraged me to believe that green cities and a sustainable future is possible. Thank you so so so much.

Practitioner /Consultant working in local government in England: This was one of the best courses I have ever completed. It was so engaging, detailed, comprehensive and thorough - I must admit I was expecting it to be more entry level so I was very pleased that it wasn't as despite having 15 years experience in FCERM I learnt so much and consolidated and compounded a lot of knowledge in some areas, whilst learning loads on topics I knew very little about. I've noted there is a round 2 coming and I will be strongly suggesting all of my colleagues and managers complete this.... so will be looking forward to the release of round 2!

Non-academic working in an NGO in the Netherlands: This is the most thorough MOOC I have seen. There are many things to learn from it and use in your own area.

Nevertheless feedback also highlighted that a number of improvements can be made for the future version; (i) the recommend reading will be reduced(ii) In modules that are text heavy or complex to provide a more interactive learning experience and simplify the language used; (iii) Provide the learning experience also in Spanish increase the student potential to be more inclusive especially to Central and South American countries; (iv) to continue the RECONNECT legacy an interactive pdf of publication of the MOOC content should be created giving participants continued access to the course. Finally, the content will be modified expanded to cover NBS solutions not just directly related to water and flooding but also NBS solutions for small catchment areas. i.e. taking in information from other EU projects and from developing countries. Overall, the MOOC has been a very successful dissemination technique.

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Abbreviations

MOOC – Massive online open course

NBS – Nature Based Solutions

SCORMS - Sharable Content Object Reference Models

1 Introduction

The aim of this project was developing a Massive Open Online Course for Nature-based Solutions (NbS) to enable the public better understand the content of NbS and how to evaluate their co-benefits, using the methodologies created from the EU H2020 RECONNECT project. The MOOC, unlike others, is targeted at non-academics; researchers, practitioners, and policy makers. The six modules cover all aspect of NbS to provide participants with critical knowledge and skills to identify adequate NbS and estimate their effectiveness to cope with potential hydrometeorological hazards to build a climate resilient community.

Nature based solutions (NbS), a recently developed concept is an increasingly popular approach to hydrometeorological risk reduction whilst providing co-benefits to areas such as biodiversity, water quality and human wellbeing (Le Coent *et al.*, 2021). Massive Open Online Courses (MOOCs) are an open access online learning environment that learners can register for a high education course for free or at a low cost (Dillahunt, Wang and Teasley, 2014) and though a relatively new concept their demand has increased dramatically over the last decade. Especially as they democratize education, providing learners the opportunity to learn from the best educators across the world on a variety of subjects/disciplines, facilitating career development (Dillahunt, Wang and Teasley, 2014; Yousef and Sumner, 2021). Though in general there is a positive outlook on MOOCs, Zhu *et al.* (2018) concluded that greater international collaboration within MOOC creation is needed to help springboard new forms of MOOC. This is where the EU H2020 RECONNECT MOOC titled “Nature-Based Solutions for Water Management and Climate Adaptation” fills a gap. Firstly there are limited MOOCs on NbS topics available and of these all are aimed at undergraduate students. The RECONNECT MOOC differs as instead it is built on an existing collaboration/partnership between a transdisciplinary consortium that contains researchers and industry partners (SMEs and large consultancies) and responsible agencies at the local and watershed/regional level. The target audience includes non-academics, researchers, practitioners, and policy makers.

2 Content: Module overview

The main strategy of modern education argued by Yakovleva and Yakovlev, (2014) is that learning content should focus on the students independent activity, organization of self-learning environments and experimental; and practice training, and flexible training programs where students can work in a comfortable pace (Yakovleva and Yakovlev, 2014)

The MOOC, developed by the University of Exeter (UNEXE), utilizes the substantial research outcomes accumulated within the RECONNECT project as a dissemination technique. The MOOC, unlike others, is targeted at non-academics; researchers, practitioners, and policy makers. The six modules cover all aspect of NbS to provide participants with critical knowledge and skills to identify adequate NbS and estimate their effectiveness to cope with potential hydrometeorological hazards to build a climate resilient community. The course consists of 6 modules (Table1) each with their own learning objectives. Where module 1 gives a general overview of NBS and the RECONNECT project, modules 2-5 provide the skills and learning material on how NbS can be designed/implemented/upscaled to reduce the impacts of natural hazards, to improve environmental quality, biodiversity, to strengthen equality and well beings, and to promote socioeconomic development needed in order to evaluate their own NBS. Finally, module 6 providing in depth examples.

Table 1: MOOC module broken down, into their learning objectives and the organizations involved in the content preparation.

Module	Organisation involved	Organisation Type	Countries Involved
1 - Introduction to NBS for hydro-meteorological risk reduction	IHE Delft, the Universitat Hamburg, and UNEXE.	Educational Institutions	Netherlands, Germany, UK
2 - Planning and Assessment of NbS	IHE Delft, the University of Belgrade and UNEXE.	Educational Institutions	Netherlands, Serbia, UK
3 - Co-creation & Integrated design of NbS	Ramboll, IHE Delft, Helmholtz-Zentrum Fuer Umweltforschung and UNEXE.	Engineering Consultancy and Educational Institutions	Denmark, Netherlands, Germany, UK
4 - Monitoring and Evaluation of NbS	Danmarks Tekniske Universitet, Amphi, eawag and UNEXE.	Environmental Consultancy and Educational Institutions	Denmark, UK, Swiss
5 - Barriers, Enablers and Innovation within NbS	Helmholtz-Zentrum Fuer Umweltforschung, Ramboll, IHE Delft and UNEXE.	Engineering Consultancy and Educational Institutions	Germany, Denmark, Netherlands, UK
6 – Case studies	TAUW, Municipality of Odense,	Local Government, Engineering	Netherlands, Denmark, Belgium,

	EUROSENSE, Parco di Portofino and UNEXE.	Consultancy, Private Company	Italy, UK
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What is attractive about this MOOC is that the different modules are taught by a variety of experts from different backgrounds and organizations; academic institutions, environmental and engineering consultancies (Table 1). Thus, participants are getting the best of the best. As each module content was provided by different members of the RECONNECT team, before each new section an introductory piece was provided about the person (teacher/content provider was given). Figure (1) shows 3 examples of this.

“Seeking for harmony between humans, water, and the environment”



Professor Albert S Chen
Personal Chair in Water and the Human Environment at University of Exeter

Albert Chen is a Professor at the Centre for Water Systems (CWS), University of Exeter with over 20 years of experience in Water and the Human Environment studies. His research interests include water resources, hydrology and hydraulic modelling, urban drainage, flood forecasting and early warning, innovation technology applications, water-food-energy-ecosystems nexus, climate change impact to critical infrastructure, prediction of water-borne disease, hazard impact assessment, mitigation and resilience strategies. He has participated in EU H2020 RECONNECT and Horizon Europe NATALIE projects that are focusing on NbS adaptations for strengthening climate resilience.

“Just living is not enough. One must have sunshine, freedom and a little flower.” Hans Christian Andersen”



Marzena Rasmussen
Biologist and practitioner working with Amphii

Biologist and practitioner with over 20 years of experience in conservation biology, monitoring of freshwater ecosystems, habitat management and restoration, impact assessments and mitigation measures (EIA). From 2008 responsible for co-ordination & project management of international and national projects on nature conservation in Europe.

“A straight line may be the shortest distance between two points, but it is by no means the most interesting”



Lars Kildahl Sønderby
Project leader – Nature and climate, The Municipality of Odense The department for climate and environment

Lars develops and puts into action nature projects within the Municipality of Odense, Denmark. His works is strongly aligned with different EU directives such as the habitat and bird directives which are implemented on local scale.

Figure 1: Examples of introductory pieces for content providers.

The MOOC will be free to attend and learning outcomes will be assessed at the end of each module through a combination of different questions. Learners will immediately have access to Module 1 and once completed, have access to Module 2 will be granted and so on and so forth for the following modules. Therefore, the MOOC can be completed at the participant chosen pace. If all modules are passed a certificate will be available for participants.

2.1 Module 1 - Introduction to NBS for hydro-meteorological risk reduction

Module one was developed by IHE Delft and Hamburg University of Technology (Figure 2) the objectives for the module were as follows:

1. Introduce basic concept of NBS and explain the differences with traditional grey infrastructures.
2. What are the advantages co benefits of NBS vs grey infrastructure.

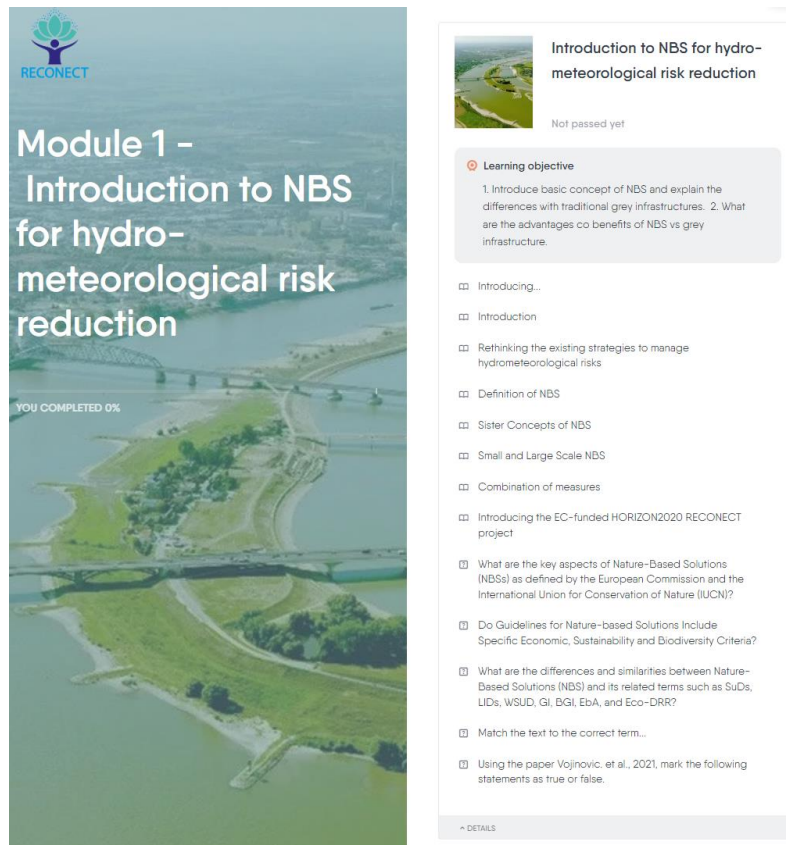


Figure 2: Layout and content within Module 1.

2.2 Module 2 – Planning and Selection of NBS

The overall objectives for Module 2 were: (i) Understand the process of planning and assessing NBS, (ii) To introduce tools to select NBS with stakeholder participation and (iii) Learn how to make a pre-intervention evaluation of NBS. The content for the four section of the module was provide by the University of Belgrade and IHE Delft. A layout of the module can be seen in figure 3.

Minor objectives set included:

- What is the baseline assessment in NBS projects;
- What is the purpose of a baseline assessment;
- What are the main aspects covered in baseline assessments.
- What are the hazard, vulnerability and risk assessments?

- Which methods are commonly used for these assessments?

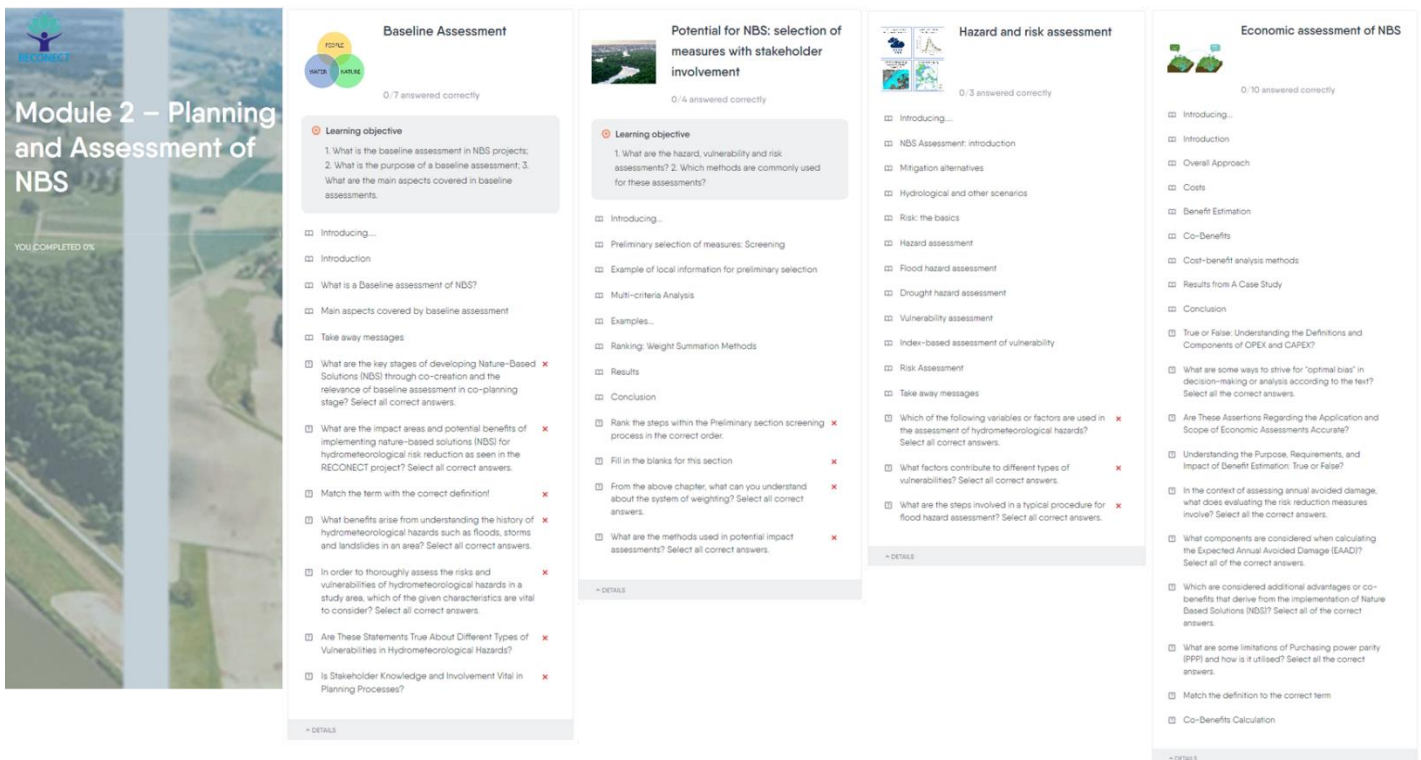


Figure 3: Layout and content within Module 2.

2.3 Module 3 – Co-creation and integrated design of NBS

The objectives of module 3 were to; (i) Gain an Understanding of different phases of the co-creation phases including; NBS upscaling and suitability mapping, and (ii) To Understand integrated and landscape design principles of NBS. Three organisations were involved in the development of the content for the module UFZ, IHE and Ramboll. UFZ focused on Co-Creation and Upscaling of NbS, IHE on NBS suitability mapping and Ramboll the Integrated design of NBS. A layout of the module is shown in Figure 4.

Minor objectives for each included:

- To gain knowledge on the co-creation approach, its value, and main principles while applying within the NBS realisation process.
- To learn the seven-step strategy for organising co-creation of NBS
- To learn what “scaling of NBS” means and how to scale up the use of NBS;
- To explore the main types of NBS scaling.

- To provide/understand hydraulic engineering and landscape design principles.

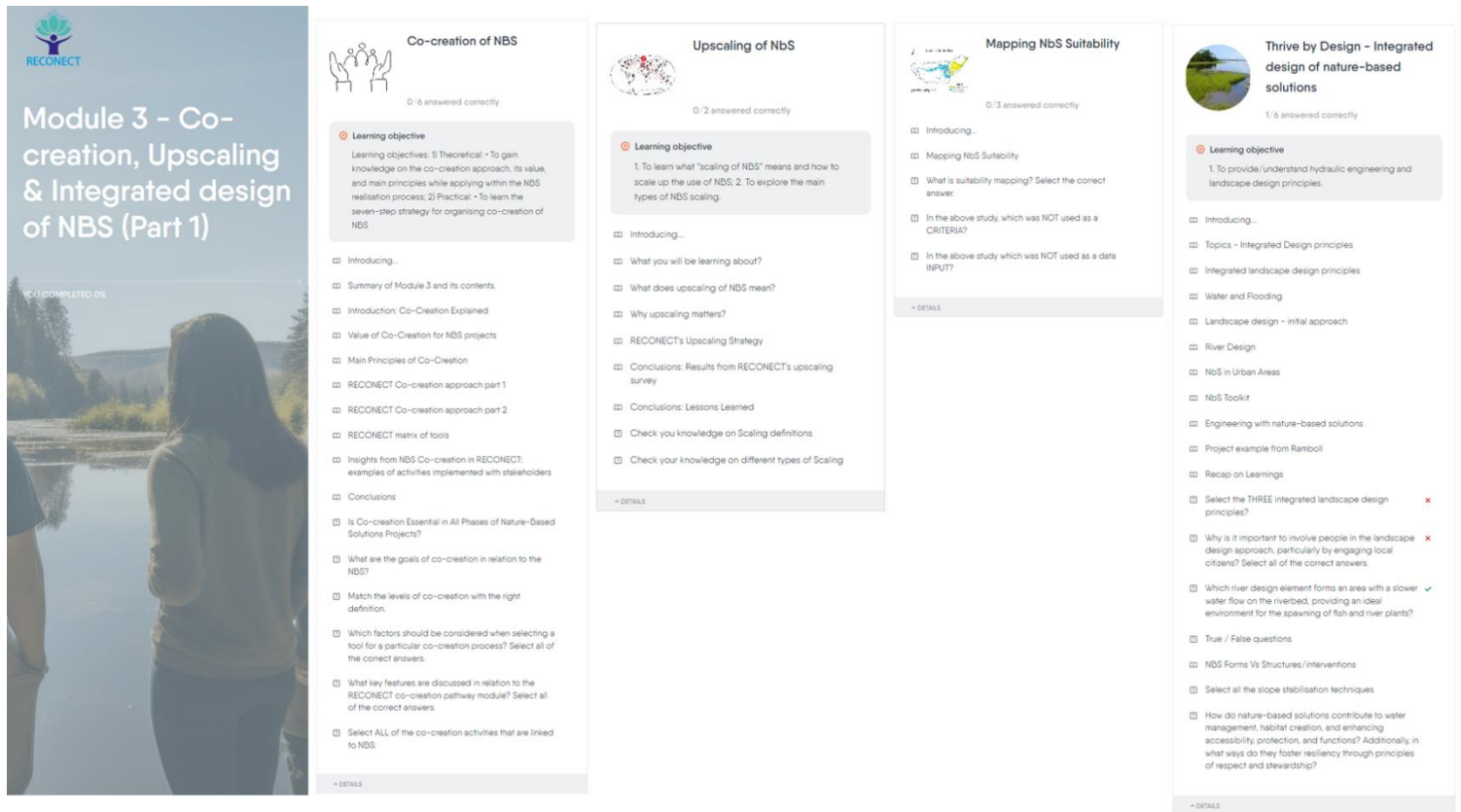


Figure 4: Layout and content within Module 3

2.4 Module 4 – Monitoring and Evaluation of NBS

Module 4 was split into three main sections: Water, Nature and People. The overall objectives for the section were.

- To gain understanding of monitoring methodological techniques and instruments
- To gain understanding of different evaluation approaches and techniques for implemented NbS

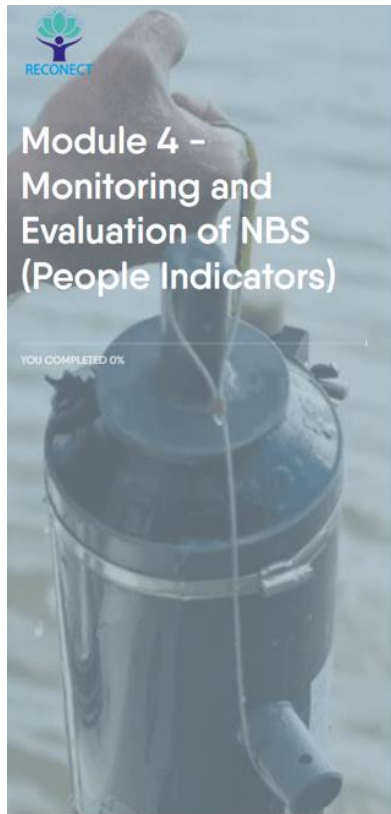
DTU took responsibility for the People indicators (Figure 5). Each of these sections had minor LO specific to their content.

Quantifying the intangible benefits of NB.

1. To learn why the quantification of intangible benefits of NBS is important.
2. To be introduced to and see the results of one of the possible approaches to do quantify intangible benefits of NBS.

Quantifying amenity values when planning NBS

1. Understand how annual co-benefits of NBS are derived from the willingness to pay of households.
2. Compute co-benefits for an NBS site, given its area, population density and amount of natural land uses in the vicinity.



Quantifying the intangible benefits of NBS

0 / 5 answered correctly

Learning objective

1. To learn why the quantification of intangible benefits of NBS is important. 2. To be introduced to and see the results of one of the possible approaches to do quantify intangible benefits of NBS.

- Introducing...
- Focus on non-market benefits
- Total Economic Value
- Quantification methods
- APPLICATION IN RECONNECT.
- Co-design
- People Indicators in RECONNECT
- Results from the application within RECONNECT
- Recap/Conclusions
- Which of the following factors characterise the 'business as usual' strategies? Select all of the correct answers.
- Which of the following is considered a market benefit?*
- Understanding Non-Market Benefits
- Willingness-to-pay surveys question
- Explain briefly why it is important to quantify the non-market benefits of NBS as well.

[- DETAILS](#)

Quantifying amenity values when planning NBS

0 / 9 answered correctly

Learning objective

1. Understand how annual cobenefits of NBS are derived from the willingness to pay of households. 2. Compute co-benefits for an NBS site, given its area, population density and amount of natural land uses in the vicinity.

- Introducing...
- Studies
- Annual amenity value of an NBS
- Variation of unit values
- Metamodel
- Using the model for planning purposes - An Example
- Summary
- Which of the following statements accurately reflect the process of deriving amenity values from the willingness to pay for Nature-Based Solutions (NBS)? Select all of the correct answers.
- What is done to derive an amenity value per hectare of nature according to the questionnaire studies? (single answer).
- Calculate the Travel Distance for Seden Strand in Odense
- What is the population density for the area of Seden Strand in Odense?
- What is the economic unit value in EUR per hectare per year (assume that the NBS benefits 5,700 persons)?
- What is the willingness to pay expressed in 2021 USD for Seden Strand?
- What is the willingness to pay expressed in 2021 USD, for Chester, UK?
- What factors affect the unit amenity values according to the text? Select all of the correct answers.
- Statements about the predicting unit amenity values.

[- DETAILS](#)

Figure 5: Layout of content provided by DTU for Module 4

Nature indicator content was provided by Ampii, an environmental consultancy based in Denmark. And covers the nature indicators used within RECONNECT including: (i) Change in land cover, habitats and land use (quantity), (ii) Habitat provision and distribution (quality), and (iii) Species richness and composition Figure 6. Examples from RECONNECT came from the Danish demonstrators Ega Engo and Sedan Strand.

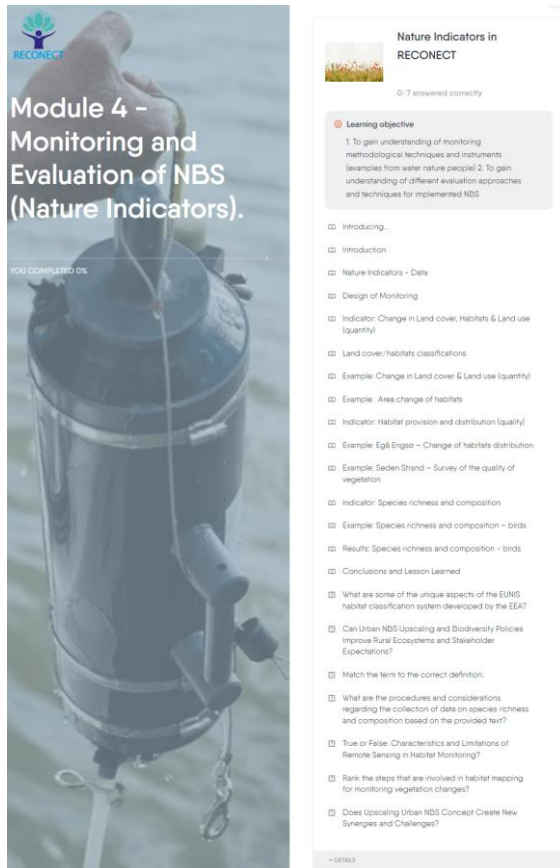


Figure 6: Layout for the 'Nature indicator' section of Module 4 provided by Ampii

Water indicator content was provided by UNEXE and eawag, due to number and range of different indicators used within RECONNECT the section was split into 3 different sections Figure 7. These were; (i) Water Quantity – Flooding including Fluvial, Pluvial and Coastal (UNEXE), (ii) Water quantity – Groundwater and Drought (UNEXE and eawag) and (iii) Water Quality (eawag).

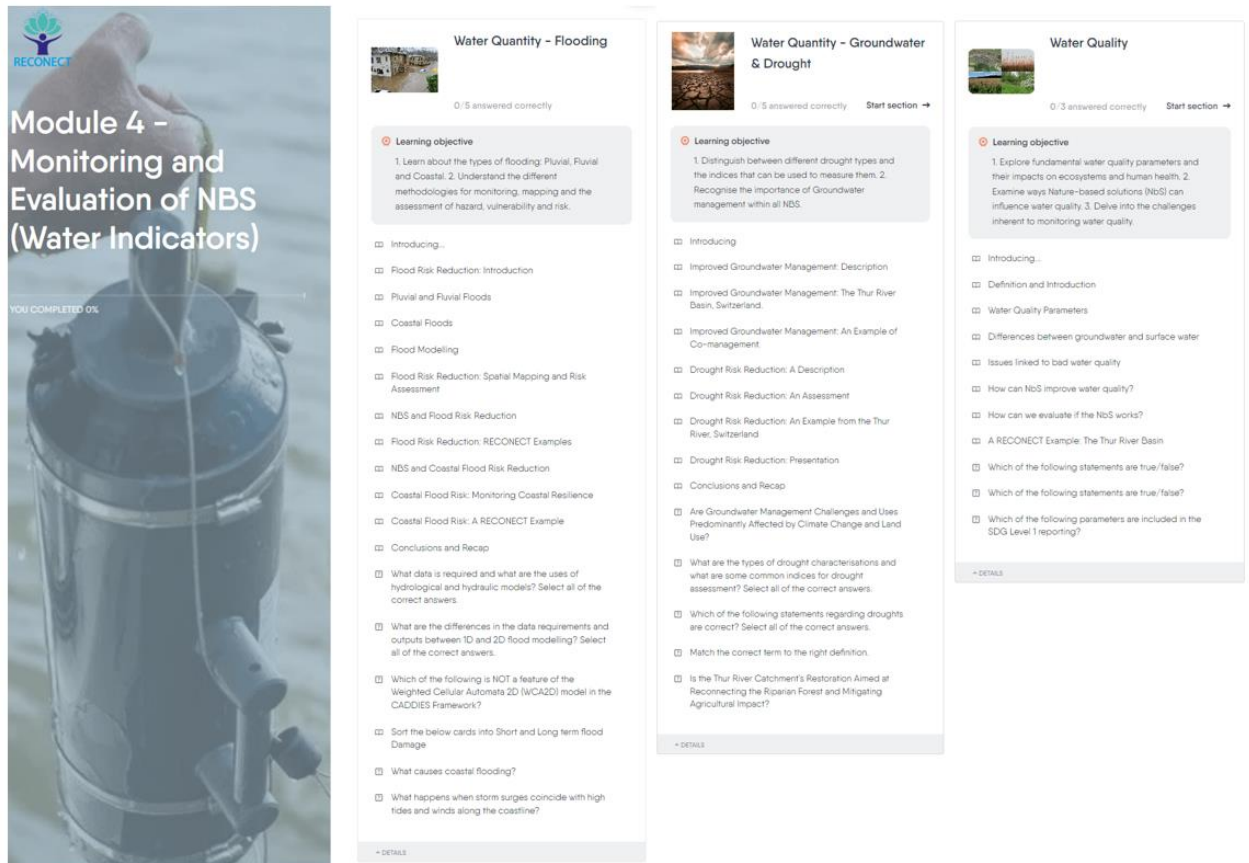


Figure 7: Layout of content for "Water Indicators within module 4.

Due to variety minor objectives were set for each section, these included.

Water Quantity – Flooding including Fluvial, Pluvial and Coastal

1. Learn about the types of flooding: Pluvial, Fluvial and Coastal.
2. Understand the different methodologies for monitoring, mapping and the assessment of hazard, vulnerability and risk.

Water quantity – Groundwater and Drought

1. Distinguish between different drought types and the indices that can be used to measure them.
2. Recognise the importance of Groundwater management within all NBS

Water Quality

1. Explore fundamental water quality parameters and their impacts on ecosystems and human health
2. Examine ways Nature-based solutions (NbS) can influence water quality
3. Delve into the challenges inherent to monitoring water quality

2.5 Module 5 - Barriers, Enablers and Innovation within NBS

Module 5 was split into three sections; Barriers, Enablers and Innovation. Where UFZ took responsibility for the content for the former two, Ramboll took responsibility for providing content for the latter Figure 8. The learning objectives for the module included:

- Gain an understanding of the most common barriers and enables involved in NBS implementation.

- Learn how the commercial exploitation of NBS Innovations can support the upscaling of solutions.
- Understand the different steps taken within RECONNECT to identify and maximise the potential of innovative NBS results.

Module 5 - Barriers, Enablers and Innovation within NBS

YOU COMPLETED 0%

Understanding barriers of NBS using Fuzzy Cognitive Mapping
0/4 answered correctly

- Introducing
- Overview
- What are NBS barriers?
- What is Fuzzy Cognitive Mapping (FCM)?
- Building a Fuzzy Cognitive Map
- FCM Metrics
- Recap on learnings and conclusion slide.
- Types of Links. Match the term to the correct definition. ✘
- Which of the following are considered potential barriers ✘ in the institutional context and legal context of Nature-Based Solutions (NBS)? Select all the correct answers.
- Is the Effectiveness of NBS Concerned with Value, Potential Demerits, Design, Cost, and Overall Benefit? ✘
- What are the features and applications of Fuzzy Cognitive Mapping (FCM)? Select all the correct answers. ✘

RECONNECTS Barrier analysis and identifying Enablers
0/7 answered correctly

- Introducing
- Kanchia River Basin
- Dregania River Basin
- Vibanja River Basin
- Pilica River Basin
- Jadar River Basin
- Tamnava River Basin
- Recap On Learnings
- In regards to Slo thinking: What potential enablers could support the effective uptake of NBS according to the Barrier Analysis done by RECONNECT? Please select all the correct answers. ✘
- What are some ways to improve the land acquisition process for Nature-Based Solutions (NBS) as suggested by RECONNECT's analysis? Select two or more options. ✘
- What are some ways to improve the land acquisition process for Nature-Based Solutions (NBS) as suggested by RECONNECT's analysis? Select two or more options. ✘
- What strategies are suggested to improve the level of understanding and awareness of Nature-Based Solutions (NBS) among decision-makers and public authorities? Select all of the correct answers. ✘
- Which strategies can be implemented to overcome the ✘ barrier of inadequate funds for nature-based solutions (NBS) projects? Select all of the correct answers.
- What are some potential enablers to improve political ✘ will and long-term commitment to promoting Nature-Based Solutions (NBS)? Select all the correct answers.
- What are the potential enablers to overcome the barrier ✘ of lack of immediate drive to implement NBS? Select all of the correct answers.

Business models and innovation.
0/11 answered correctly

Learning objective

1. Learn how the commercial exploitation of NBS results can support the upscaling of these solutions
2. Understand the different steps taken within RECONNECT to identify and maximise the potential of innovative NBS results

- Introducing..
- Financing of Nature Based Solutions
- Why financing matters.
- Barriers to financing of Nbs
- RECONNECT's contribution
- Exploring Innovation in RECONNECT.
- The Chosen Innovations
- Application of the Business Model Canvas and Road Map to the selected innovations
- Recap on Learnings
- Is Innovative Finance Key to Bridging the Gap in NBS Investment?
- Financing – essential enabler for upscaling
- What is NOT considered a key aspect of institutional capacity?
- What aspects are typically included in the benefits component of the cost-benefit data? Please select all the correct answers.
- What are the implications of short-termism and why is its mitigation important? Select all the correct answers.
- Can Underestimating Natural Capital Lead to Unsustainable Environmental Outcomes?
- What are the potential impacts of voluntary commitments? Select all the correct answers.
- Match the text to the following terms...
- How are the Commercial Readiness Index (CRI) and Technology Readiness Level (TRL) levels distributed and what do they represent in the innovation process? Select all the correct answers.
- What are the significant differences and interpretations of Technology Readiness Level (TRL) and Commercial Readiness Index (CRI) in the context of innovation assessment? Select all the correct answers.
- Is Multicriteria Analysis Limited to Environmental Impact and Unused for Strategic Planning?

Figure 8: Layout of content for Module 5 provided by Ramboll and UFZ.

2.6 Module 6 – Case studies

The idea of module 6 was to lean in more depth about 3 key demonstrators within the RECONNECT project, each with a different hydrometeorological hazard: Netherlands (Riverine), Portofino (Mountainous) and Odense (Coastal) (Figure 9). Input for the module came TAUW, Parco di Portofino, Municipality of Odense, and EUROSENSE.



Portofino Park: A Catchment Scale Holistic ecosystem-based approach

0 / 9 answered correctly

Learning objective

To understand: • NBS approach at a catchment scale; • Shallow landslides and erosion risk mitigation strategies; • Remote sensing and geomorphometric analysis techniques for the identification of man-made terraces.

- Introducing Guido Pallaga...
- Introduction to Case Study
- Features of the Area
- Project Drivers - The Hazards
- Monitoring activities
- Terraces Identification and Volume Calculation
- NBS Risk Reduction Strategy: A Catchment Scale Holistic ecosystem-based approach.
- NBS measures in San Fruttuoso area
- NBS measures in Paraggi catchment
- Concluding Remarks
- What is the geographical and climatic characterisation of the Portofino promontory? Please select all the correct answers.
- What are some of the causes and impacts of flash flooding and shallow landslides, and how can their impact be mitigated? Please select all the correct answers.
- What are the uses and characteristics of small catchments? Please select all the correct answers.
- Using the paper 'GIS-Based Landslide Susceptibility Mapping for Land Use Planning and Risk Assessment'. Which statements accurately reflect the new methodology proposed? Please select all the correct answers.
- What steps and tools were used in the process of risk analysis for landslides at the Portofino Park? Please select all the correct answers.
- Rank these in order of Performance from the best (1) to worst (4).
- Is Point Density of LIDAR Data Crucial in Modelling Topographical Elements and Landslide Risks?
- Assessment of Stone Walls in Olive Orchards
- What are the 4 main objectives of the catchment scale holistic ecosystem-based approach proposed in the Portofino Park? Please select all the correct answers.

← DETAILS

Making Room for the River, a case study from the Netherlands.

Not passed yet

- Introducing...
- Introductory interview with former RfR programme director Ingwer de Boer!
- IJssel River Basin, the Netherlands
- The measures
- Spatial Planning Key Decision Framework
- The Goals
- Selecting a NbS measure
- Description per RfR sub project
- A Real-Life Trial
- Some Results...
- Final remarks on project management
- What are some of the aspects to consider during the process of floodplain construction? Select all of the correct answers.
- When designing an NBS for hydro-meteorological risk reduction: at what stage should nature and people be included?
- What is a good method for reducing local resistance to changes in their environment?
- What considerations are essential in the engineering design process when broadening the riverbed in a river restoration project? Select all of the correct answers.
- What strategies should be part of dike strengthening to improve its integrity and resilience? Select all of the correct answers.
- Does the Spatial Planning Key Decision Framework Foster Consensus and Enable National Government Supersession?
- Did the RfR Programme Implement Key Strategies and Establish a Quality Team for Spatial Quality Management?
- Explain the Hydrology-ecology dilemma?

← DETAILS

Odense: Synergies matters, when choosing nature-based solutions!

0 / 7 answered correctly

- Introducing...
- What will you be learning about...
- The Directives
- The Flood directive
- The Habitats and Bird Directives
- The Water Framework Directive
- The problems and solutions?
- Implementation
- Results - A happy success story for all!
- Concluding / Summary
- Are these statements about the Floods Directive in Member states true or false?
- What are some of the key provisions and objectives of the EU's Water Framework Directive? Select all the correct answers.
- What does the Water Framework Directive require from EU member states regarding public participation and cooperation in water management? Select all the correct answers.
- Does the Habitat Directive of EU Encourage Public Participation in Conservation Decisions?
- Identify if these statements on the Odense cases study are true or false.
- Does the Habitat Directive of the EU Encourage Public Participation in the Conservation of Habitats and Species?
- What are some of the key provisions and objectives of the Bird Directive? Select all the correct answers.

← DETAILS

Figure 9: Layout of content for Module 6 "Case studies".

2.7 Interactive Learning

The MOOC was created using an AI-powered e-learning creation tool. The tool enabled the user to create engaging e-learning or create company-tailored courses known as SCORMS (Sharable Content Object Reference Model). Content was originally provided in pdf/ppt format by the organization mentioned in Table 1, after which UNEXE transformed these into SCORMS. SCORMs were the preferred final design, rather than using ppt, as SCORMs lend themselves to more creative/interactive/engaging learning material/options, which would be more beneficial to learners. Once created these were downloaded and uploaded onto the learning platform Moodle. All SCORM content was created by the UNEXE, who also hold access to the http for the RECONNECT Moodle.

Via the MOOC the scientific methodologies and findings developed in RECONNECT were constructed as an easily understandable content via creative infographic, videos, and interactive learning activities to transfer the knowledge and applications to the public.

Examples include a variety of different interactive learning methods. Features such as clips from YouTube (Figure 10), articles from journals and reports in the form of pdfs (Figure 11), links directly to websites i.e. to NBS tools, podcasts, RECONNECT webinars, news articles and data sources (Figure 12) were embedded within the SCORMS.

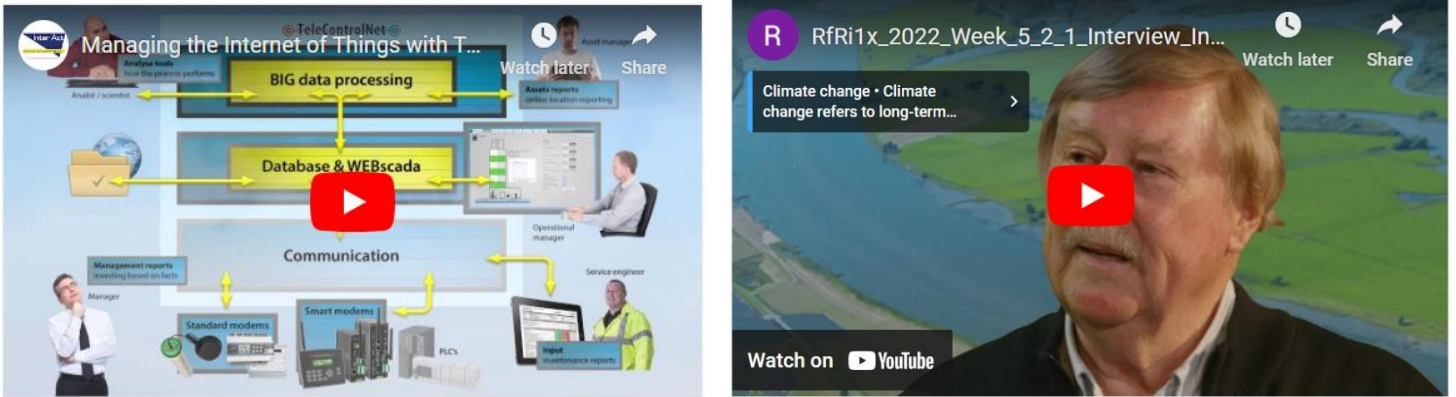


Figure 10: Examples of youtube videos that have been embedded into the MOOC

Show more - Please read Section 2 (Materials and methods), where the methodology behind the questionnaire is explained.

1-s2.0-S0301479723002864-main [DOWNLOAD \(5.67 MB\)](#)

Types include: Coastal Forests, Mangroves, Rocky Shore, Sandy Beaches, Mudflats, Sandflats, Seagrass Meadows and Coral Reefs. Please Read pages 21-25 and 32-46 in the below document.

Singapore Coastal nbs-guide [DOWNLOAD \(12.54 MB\)](#)

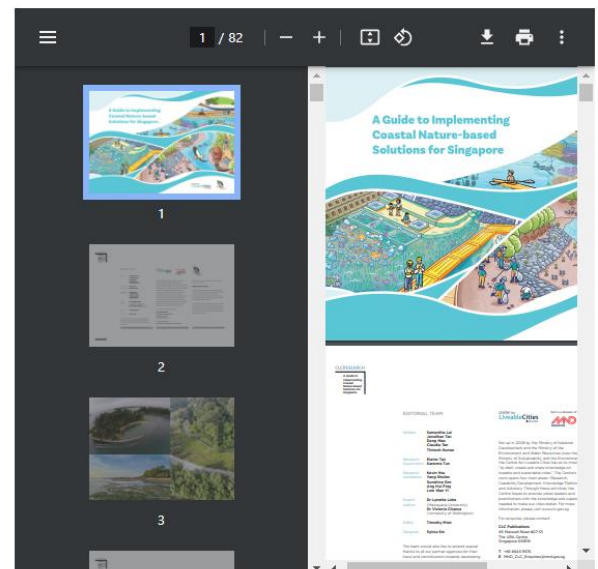
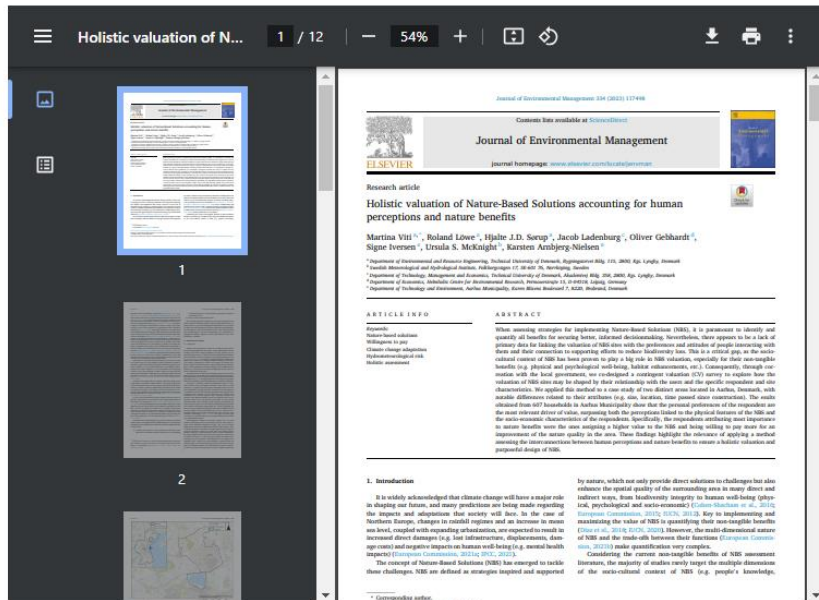


Figure 11: Example of how journal articles and reports can be embedded into the MOOC

Types of Drought

Research in the early 1980s uncovered more than 150 published definitions of drought. The definitions reflect differences in regions, needs, and disciplinary approaches.

Wilhite and Glantz categorized the definitions in terms of four basic approaches to measuring drought: *meteorological, hydrological, agricultural, and socioeconomic*. The first three approaches deal with ways to measure drought as a physical phenomenon. The last deals with drought in terms of supply and demand, tracking the effects of water shortfall as it ripples through socioeconomic systems.




Types of Drought | National Drought Mitigation Center

[Visit the page](#)

Factsheets on Water Quality Parameters

The water quality parameter factsheets were developed to provide an introduction to monitoring common parameters; Temperature, Dissolved Oxygen, pH, Turbidity, Macroinvertebrates, E. coli, Nutrients, Habitat Assessment and Metals. They are particularly useful for training new water quality monitoring staff and explaining water quality sampling to outside partners. Use the link below to find more detailed information on each parameter.



Factsheets on Water Quality Parameters | US EPA

Factsheets on water quality monitoring and parameters. EPA Water Quality Parameters Water Quality Parameter Factsheets Parameter Factsheets

[Visit the page](#)




RECONNECT Webinar #1: Introduction and Opportunities for NbS: reflections from RECONNECT.

Climate change - Climate change refers to long-term... #1

Watch on  YouTube

www.reconnect.eu/webinars

Listen to this 3 part podcast on Coastal Resilience in the face of Climate Change: Part three is all about how NBS can enhance coastal resilience.



Coastal resilience in the face of climate change

Coastal areas around the UK are facing significant climate change-induced risks, such as flooding and erosion. With the ongoing warming of our planet, these adverse events are likely to increase in fr

[Visit the page](#)

Figure 12: Examples of weblinks, podcasts and webinars that have been embedded within the MOOC.

The MOOC also provides a variety of audio, videos and pictures, some of which have been made into “hot spot” images where the learner may click on a certain aspect and a definition or more information on that particular point will appear (Figure 13). Along with regular text, content has been displayed in a number of ways to provide the learner with a varying interactive experience; examples included click down tabs, flip cards (pictures one side and definition on the back) and tick as you learn segments (Figure 14). Figures and results from RECONNECT have been used throughout the modules to help disseminate and share findings across all aspects. Recommended reading has been taken from published journals articles, EU reports, RECONNECT deliverables and any additional material deemed necessary/additional teaching material recommended by content providers.

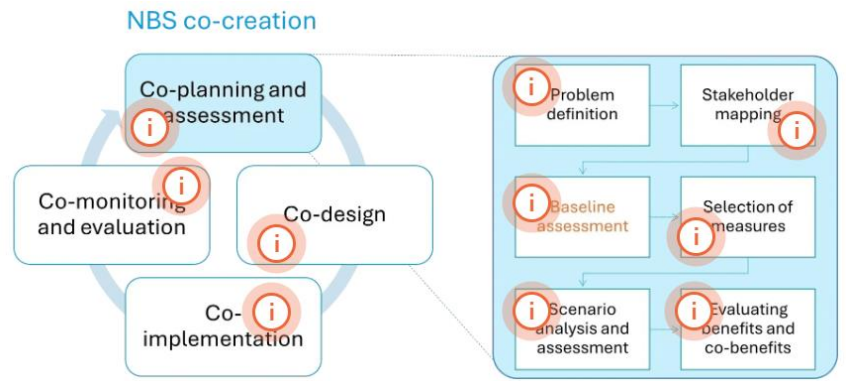
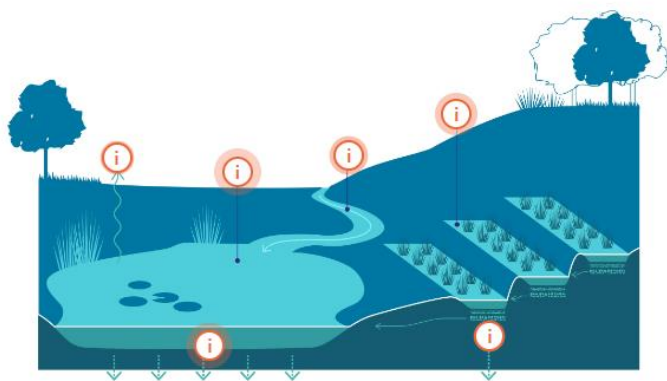


Figure 13: Example of how interactive images have been used.

Results from the application within RECONNECT

Case Studies

Socio-demographic Characteristics

Attitudes towards the NBS areas/Relationship to and use of the NBS area

Personal Preference and Concern over Risk

Willingness-to-pay values

Below shows the socio-demographic characteristics of the respondents across sites.

On average, the survey respondents were older than the EU average, and lived close to the NBS area. An exception for this last result were the respondents for Portofino, that were on average visitors travelling from further away to enjoy the Park.

Barriers to financing of NbS

Instructions.

Learn as you go! Tick off the barriers as you read through!

2/11 completed

Information/knowledge gaps

A knowledge gap is defined as a shortfall/ disparity of knowledge or the difference in knowledge levels. In an organisational context a knowledge gap is a skill, expertise, or information that an employee lacks to perform their job effectively. In a social context, a knowledge gap is a knowledge disadvantage that one cohort of people has compared to another.

Lack of financial resources

Poverty can refer to the lack of adequate financial resources. i.e. in the instance individuals, organisations, and communities don't have the means to subsist or acquire the means or needs to implement NbS.

Indegree

click to flip

Outdegree

click to flip

Listen to an audio of the endangered Natterjack toad which has been reintroduced into the Odense demo site.

▶ 0:19 / 0:19 🔊 ⋮

Incoming links
Cumulative strength of connections through which a concept is affected by other concepts.

click to flip

Out-going links
Cumulative strength of connections through which a concept influences other concepts.

click to flip

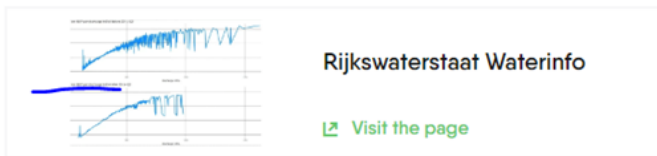
Figure 14: Examples of how content can be displayed within easy generator: Tab system, Tick though Lists, Flip Cards and Audio recordings.

In addition to the above access to data links were provided with optional tasks associated to some of these. For example, in the Portofino case you can download a Zipfile onto you computer and visually look at the 3D Geomorphometric analysis that took place, whereas in the RftR module you can download data from a link provided to make your own Q-H diagram (Figure 15).

Q-H Task:

1. Q-H Diagram Data Link

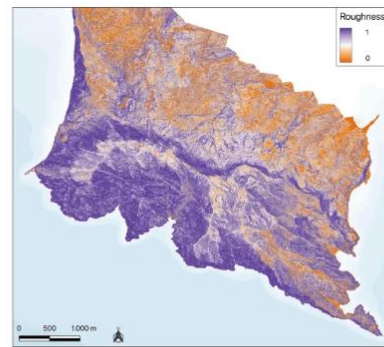
If your feeling up to if draw a Q-H diagram for a location in the IJssel for the last 28 days. E.g. for Olst. You can download the data for Q in the link below:



Geomorphometric analysis, via a DTM, gives a quantitative and numerical landscape description. This means that through a GIS environment specific feature can be viewed.

In the case of Portofino Park Geomorphometric analysis was used to quantitatively assess the territory conditions, geomorphological features and ultimately precisely detect the small or partially collapsed man-made terraces, even through the vegetation. This is crucial to the area as man-made terraces are NBS and thus need to be identified so that they can be fixed when they collapse.

Download the zip file and take a look for yourself!



3D_Portofino

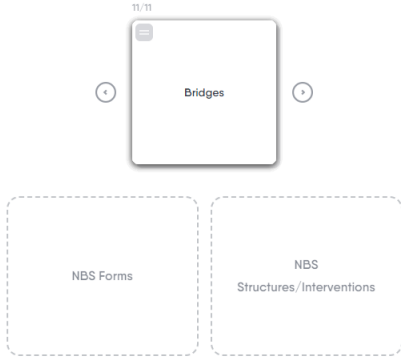
DOWNLOAD (27.57 MB)

Figure 15: Example of the embedded data downloads within the MOOC

In addition to the above an assortment of different styled assessment/questions were added to each of the modules these include; card sorting, fill in the blank, multiple choice, text matching, open ended, true or false, ranking and single choice (in the example below this uses an equation). Examples can be seen in Figure 16. The most common questions used were multiple choice and true of false options. But a variation has been used throughout and within each module. To pass a module participants needed 90%, once achieved they would be granted access to the next module and so on and so forth.

NBS Forms Vs Structures/interventions

Sort each of the different cards into the correct NBS forms or Structures/interventions.



Financing – essential enabler for upscaling

Methods / guidelines for the development of Nbs business cases are imperative to Nbs solutions.

Mainstreaming the mechanisms for acquisition of funding (especially) will help scaling up.

The ability to not be entirely on public funding will be the driver needed for Nbs to be a real alternative to infrastructure!

Using the paper "GIS-Based Landslide Susceptibility Mapping for Land Use Planning and Risk Assessment". Which statements accurately reflect the new methodology proposed? Please select all the correct answers.

- The methodology uses 9 predisposing factors, including lithology, aspect, acclivity, land use among others.
- The methodology is based on 50 years of landslide inventory.
- 110 years of landslides inventory was used with an 80% training and 20% calibration division.
- The methodology disregards the importance of terraces localization as an input factor in the model.

Match the levels of co-creation with the right definition.

Consulting	+	Active engagement where stakeholders are the main actors and equal project partners
Empowering	+	One-way passive engagement, when the co-creator aims to inform about the project
Informing	+	Means initial engagement where we involve people in the co-creation process through the establishing of partnerships etc.
Collaborating	+	Based on the two-ways dialogue aiming to get a consultation in form of

Click on the plus sign (+) to set/create a match.

Explain the Hydrology-ecology dilemma?

Type your answer here...

Are these statements about the Floods Directive in Member states true or false?

Mark the following statement as either true or false

- True False
- The Floods Directive does not consider the potential effects of climate change in its flood risk management plans.
 - Under the Floods Directive, Member states are required to develop and maintain flood hazard and risk maps and to promote public awareness and disseminate information about flood risks.
 - The Floods Directive is only applicable to member states that have coastal areas and does not concern those with only inland water bodies.

Rank the steps within the Preliminary section screening process in the correct order.

- 1 = Identify the affected area of such problems must be defined as either urban area, non-urban area or both.
- 2 = Identify current land surface type in the area (e.g. artificial surfaces, agricultural areas, forest and semi-natural areas, wetlands or water bodies).
- 3 = Identify the potential location for implementation of measures. There are two main types of locations for implementation: urban areas and non-urban areas.
- 4 = Identify project type that would be implemented; i.e. whether the completely new measures are to be implemented or existing measures are to be improved.
- 5 = Identify the measure type that you would like to implement which can be NBS or grey infrastructure.
- 6 = Identify and consider the problem and hazards in the area, based on the hazard type, as the consequences of an event varies greatly depending on the hazard.

Calculate the Travel Distance for Seden Strand in Odense

Consider the site of Seden Strand in Odense. The NBS has an area of 27ha. It is located at coordinates 55°26'27.1"N, 10°27'38.0"E.

Remember, NBS size needs to be provided in ha, TravelDistance is computed in km

Use this equation:

$$\text{TravelDistance} = \exp(0.132 + 3.434 * (1 - \exp(-1.622 * \ln(\text{size}))))$$

- 5.9km
- 6.1km
- 5.3km
- 5.5km
- 6.9km

Figure 16: Example of question types within the MOOC.

3 Feedback

The MOOC was live from the 2nd August 2024 and ran for 6 weeks, after which though the course was left open for participants to continue learning feedback was collected.

As of the 16/09/2024 there were 303 participants signed up to the MOOC, with an additional 19 RECONNECT members which were assigned roles of Teachers/No-editing Teachers – These were the original content creators with the aim to enable discussion with participants within the forums. Of the 303 participants signed up, 166 officially started Module 1, and as of the 16/09/2024 137 were still actively participating within the modules and 20 had completed the entire MOOC within the 6weeks (Table 2). This means from the 303 participants that signed up 51.8% went on to complete the course, and of the 166 who started M1 only 5.4% failed to continue further (9 participants dropped out), with 6.3% (19) having completed all of it. Considering MOOCs are known for their high dropout rates, (90-95%) (Maya-Jariego *et al.*, 2020; Palacios Hidalgo, Huertas Abril and Gómez Parra, 2020), compared to the rate of enrolment (Li, 2019). Considering the RECONNECT MOOC, after the 6weeks, only 48.2% (Total of participants who signed up but didn't start and participants who stated M1 but failed to continue) had dropped out. This is a good achievement.

Table 2: Participant numbers within the Modules

	Currently participating within a Module	Completed	Total
M1	80	86	166
M2	33	47	80
M3 (P1)	5	39	44
M3 (P2)	3	38	41
M3 (P3)	1	36	37
M4 (P1)	6	30	36
M4 (P2)	3	27	30
M4 (P3)	2	25	27
M5	3	22	25
M6 (P1)		22	22
M6 (P2)		22	22
M6 (P3)	1	20	21
Sub Total	137		
Total Remaining	157		
Dropouts	9		

After completing the MOOC to receive their certificate (Figure 17) participants were asked to fill in a feedback form. The form enables us the consortium to understand where improvements might need to make within the MOOC for future participants and what worked well and what didn't. The feedback form was split into 4 sections; Participants Background, Module Contents, Learning outcomes, user experience.

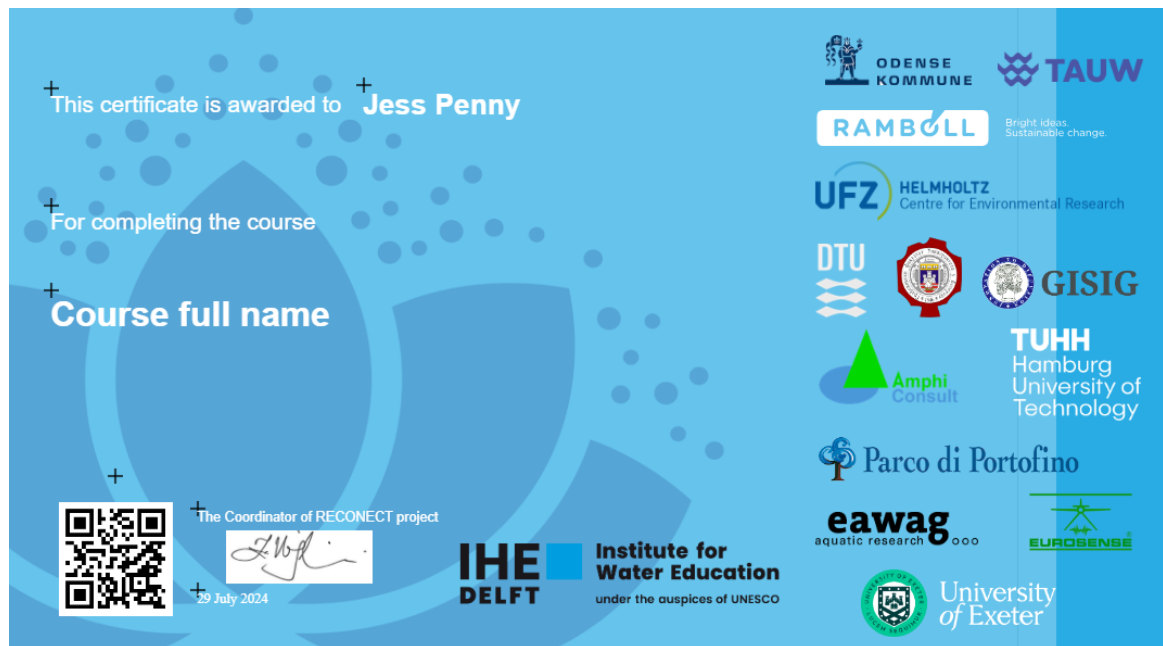


Figure 17: Example of certificate for completing the MOOC. All content creator logos have been used.

3.1 Participant Background

From the 20 participants that had completed the MOOC, within the 6 weeks, and the writing of this deliverable, the majority would describe themselves as Researchers (28%), however Engineering (15%) and Environmental (13%) consultancy and postgraduate students (15%) were also identified along with NGOs (8%) and or Local/National Government (Figure 18). In addition to the above there was a range of understanding on NBS from Never heard of NBS to having string expertise (Figure 19). The geographic location of participants was also pretty varied, though mostly from European countries (UK (15%), Spain (10%) and Italy (15%) others were also from central America (Colombia (10%), Mexico (5%) and the Middle East (Figure 20). This is a good mix highlights that the MOOC reached its target audience, it is hoped that when more participants completed the MOOC this range will continue to become more varied.

How would you describe the sector you work in?

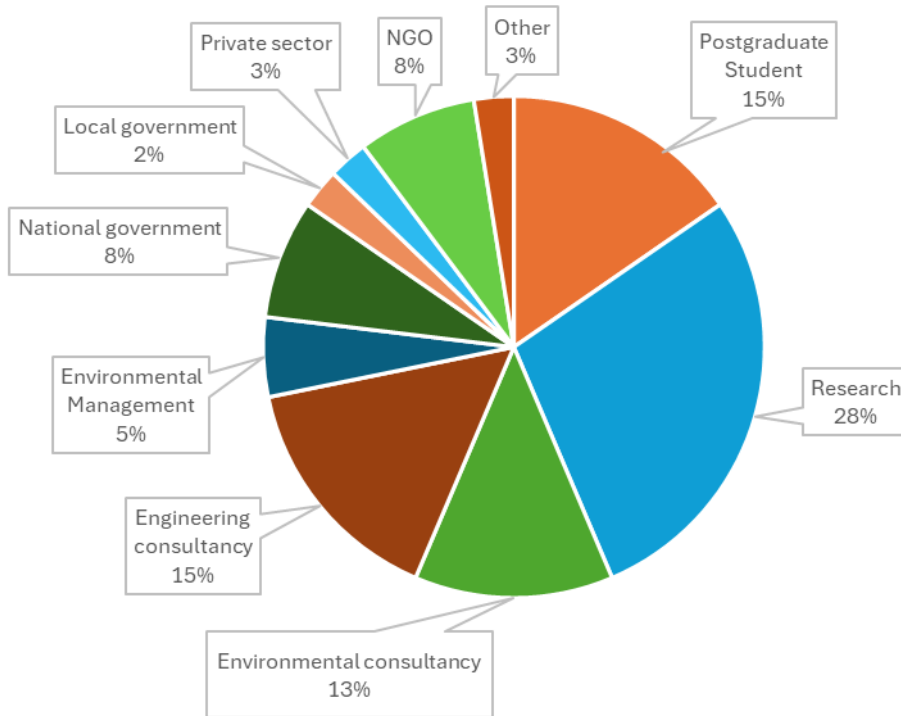


Figure 18: Results describing the sector of work of completed MOOC Participants

Prior taking the MOOC, how familiar were you with NBS?

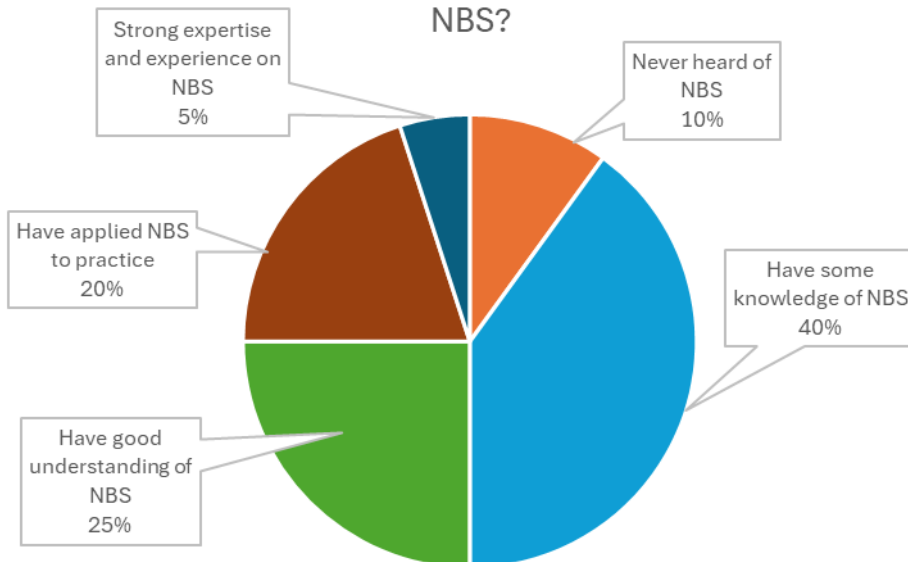


Figure 19: Level of familiarity with NBS of the Participants who had completed the MOOC.

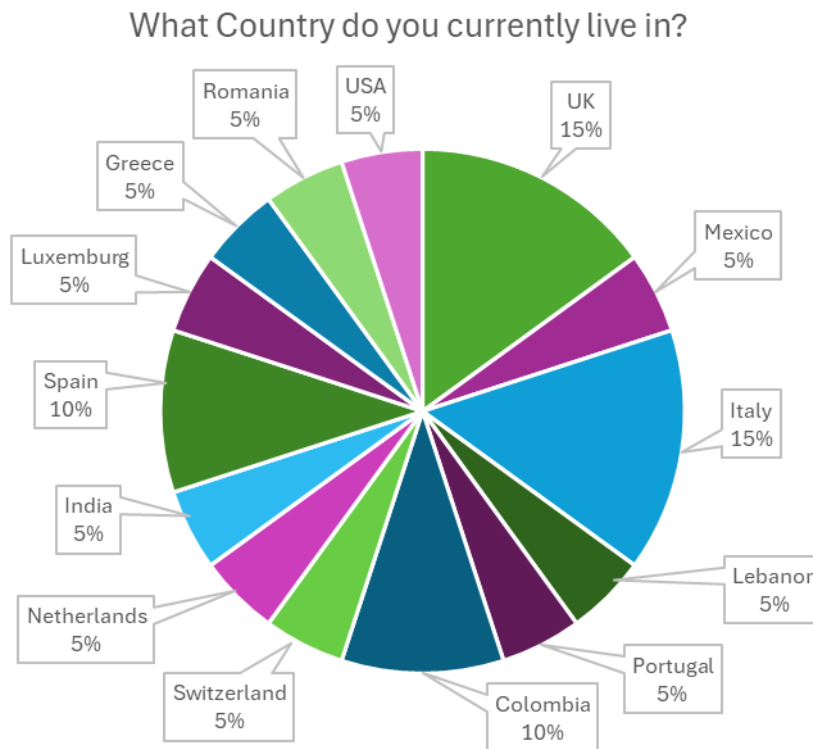


Figure 20: Worldwide distribution of Participants who completed the MOOC

3.2 Module Contents

Participants were asked which was the favourite and least favourite module and why. Most popular modules were 2,3 and 4 with comments such as:

“...All of them! They were all incredibly well balanced, thorough and comprehensive, and all meshed very well throughout the entire course

Module 2:

“...The module 2 was my favourite because I can see the different phases of planning

“... Modules 2 and 3 were the most interesting, as I was particularly interested in the primary stages of planning-design and implementation of NBS, the process, the engagement of the stakeholders and then the barriers that were faced.

Module 3:

“... Module 3 as co-creation and integrated design are new in the process compared to 30 years ago. It was therefore the most exciting module.

“...Module 3, the co-creation subject, was the favourite due to the information provided about the process

“...Module 3 and 4, because I’m interested in the co-creation approach and the design of NBS.

Module 4:

“...Module 4, Monitoring because it is the one of the topics that I have the most technical gaps”

“...Module 4, contents close to personal expertise, easy to follow and understand.

Every tool and methodology proposed with its related backed articles in order to apply them in projects

“...Module 4: Monitoring and Evaluation of NBS. It is a favourite module because I was very eager to gain some knowledge about quantification of intangible benefits of NBS.

“...I liked Module 4 as it provided a full methodology and techniques to monitor NBS from a different perspectives. The People section was something new and inspiring as I don't have a social science background. The case studies and examples given throughout the MOOC are very helpful to put the theory presented into a particular context.

“...my favourite module is module 4 water indicators, as it tackles technical topics that i am interested in such as hydraulic modelling”

"Module 4, as this was the best put together overall, included information most relevant to me and new, useful content. 4.1 in particular was the most engaging - the funny videos, news clips made it more 'real' and the explanations of flood modelling (hydraulic vs. hydrological) were very clear for a complete novice

Module 5:

“...I appreciated the content about finance, and about the systems thinking aspects, as these were the modules with information that was new to me (and far from my field of expertise).

“...Every tool and methodology proposed with its related backed articles in order to apply them in projects

Module 6:

“...The Module 6 as it shows clear application of NBS and the real-life outcome which act as good examples for future implementation.

“...Module 6: Case studies because they provide real experience and problem-solving mechanisms to understand the implementation of NBS in different regions. It provides a comprehensive understanding of the challenges of implementing NbS

General comments:

“...There isn't a least favourite module, I want to know as much is possible about NBS, so every module is important for my information

“...I think that all of the modules are important, that's why I felt interested in the course, because I think that its very complete

However, clearly a few improvements can be made, for example some of the content was deemed sometimes difficult to understand or too complex especially around Module 2, 3 and 5.

“..., i think that its needed to find more simple ways for explaining those modules that are longer than others, especially because there are people from other countries.... But anyway, I loved it and feel so grateful for this experience.

“...as an engineering student, the least favourite were those focusing more on policy and regulations instead of the engineering and science aspect.

Module 2 and 3:

“...Module 2, as some parts have been made too complicated and are difficult to understand.

“...Module 2 and Module 3.1. I did not find the material on Multi-Criteria Analysis engaging and could recall very little of it after completing the module.

“...Module 3 to complex and too much material

Module 5:

“... Module 5 since it was far too analytical for my interest focus (on implementing NbS)

“...Module 5, too much material.

It is important to remember that the MOOC was made for a wider audience other than just engineering, so it is understandable that some aspects (the policy side) would not necessarily been valuable to certain participants, even so 85% either agreed/strongly agreed that content was tapered to the correct audience with no participant disagreeing (Figure 22). However, improvements can be made to make the technical language simpler/shorter. Especially as 45% of participants deemed the content in the MOOC to be challenging and 10% complex (Figure 21). To address the very first comment in the above list of quotes the second version should also be produced in Spanish. Having the MOOC accessible in Spanish is also argued by Ferrari *et al.*, (2019) and may attract more participants to the course.

How do you find the level of knowledge of the MOOC?

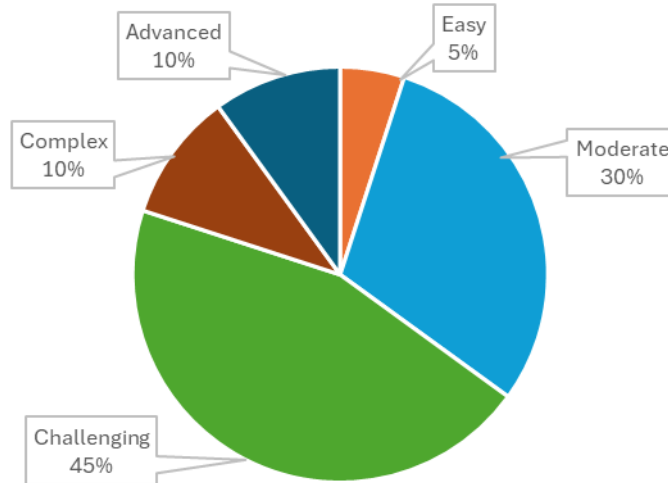


Figure 21: Perception of the level of knowledge from participants who completed the MOOC.

In your opinion was the MOOC content tapered to the correct audience?

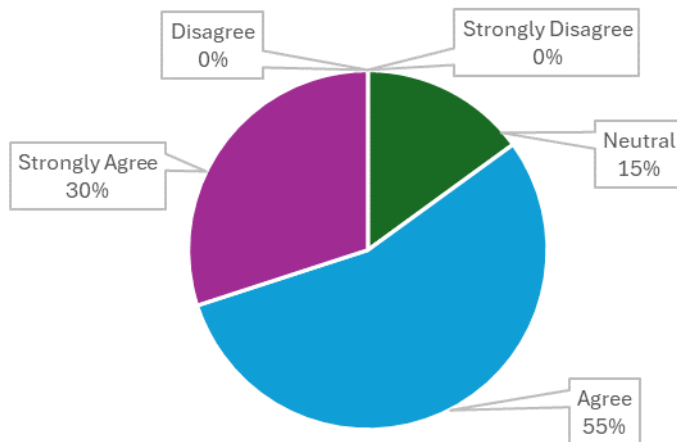


Figure 22: Participants view on MOOC content and it appropriate audience.

3.3 Learning Outcomes

Feedback from the learning outcome section was also positive with 90% of participants agreeing/strongly agreeing that they had gained sufficient/additional knowledge surrounding NBS, of this another 70% stated that their perception of NBS had changed after completing the RECONNECT MOOC (Figure 23 and 24). For example:

“...That where I work is so far behind in regards to mainstreaming NBS. The whole UK is currently, and we are making progress, but this course made me realise just how far behind other places we are. The positive is that I now have a much clearer idea of what we need to work on, and how to access resources to support this and build on work already being undertaken.”

Finally, 55% and 25% stated that they would feel confident/ very confident utilising what they had learnt and putting this into practice (Figure 25). Participants were also asked if there was one thing that they could put into practice, what would this be? Answers varied, but, many mentioned putting into practice MCA (Module 2), the co-creation/co-design (Module 3) approach as well as the evaluation methods (Module 4) and the tools used/developed within RECONNECT (Module 5). Specific comment can be seen below.

Do you feel you have gained sufficient/additional knowledge surrounding NBS?

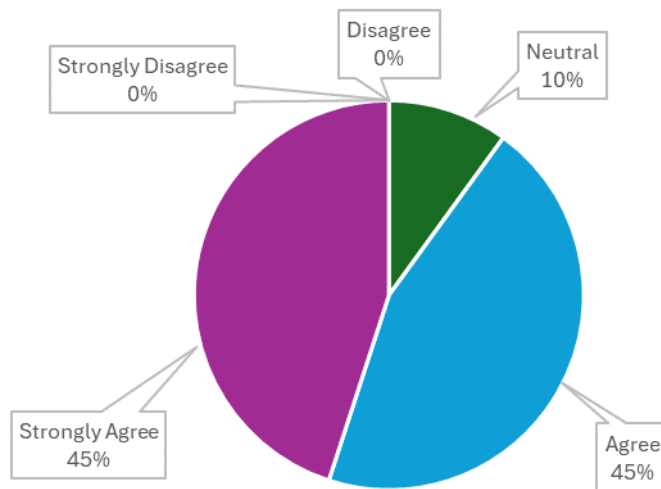


Figure 23: Completed MOOC participants view on knowledge gained.

Has your perception of NBS changed after completing the RECONNECT MOOC?

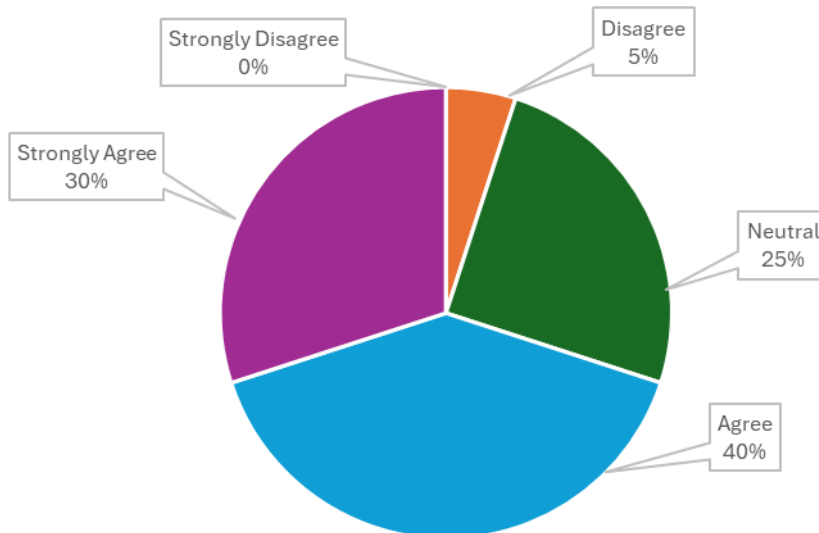


Figure 24: Completed MOOC participants view on their perception of NBS.

How confident do you feel about utilising what you have learnt and putting this into practice?

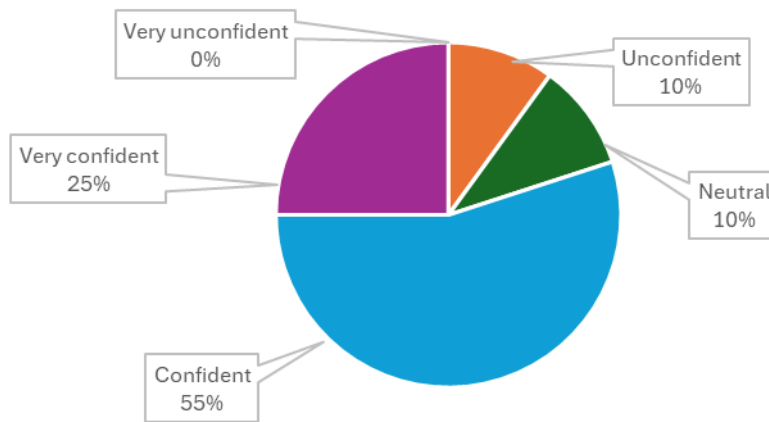


Figure 25: Completed MOOC participants view on utilising what they have learnt and putting this into practice.

Module 2:

“...The initial stakeholder engagement strategies, and the evaluation scale

“...I liked how the course provided frameworks and tools for trying to quantify and organize the NBS universe, which is very complex.

“...MCA and Evaluation methods

Module 3:

“...I would like to use the co-creation approach in practice and include people and stakeholders in the developing process of NBS. But I don't think it's easy to implement or to convince the customer (for example municipality) to do that.

“...Links were given to several tools that I can put into practice. I'll try to apply lessons learnt from co-design as a key step for implementation in my work.

“...when implementing NBSs, we should take into consideration all 3 sectors; engineering, social, and the environment as equally important.

Module 4:

“... The most valuable thing I learned is the integration of people, water and nature, i think its a very very beautiful way to involve the communities in the implementation of NBS. I really think that co-creation concept is very important and must be shared with all of the people that is working on this kind of solutions.

“...Definitions of Total Economic Value and how to calculate non-market benefits of NBS.

“...There are many things that I would like to put into practice. One key thing is the quantification of intangible benefits of NBS.

Module 5:

“...Several of the tools developed in the project can be useful for the implementation of NBS

3.4 User Experience

Feedback from the user experience was positive. Generally, most participants agreed/strongly agreed that the MOOC contained a good mix of interactive resources (55%/30%) (Figure 26) and embedded content (55%/45%) (Figure 27). Thus, the mix of Journals, websites, YouTube clips and downloadable files did help consolidate the learning experience. In addition, bar a couple of participants stating that some of videos/additional resources took a while to load (could be down to internet connection rather than the MOOC platform itself) most people said that the platform was easy to use and navigate, as well as being aesthetic and playful, helping to learn in a “dynamic way”. In addition, it was highlighted that as you can pause your progress through the module and continue later this created a non-anxiety environment esp over time limits. One participant said it was also easy to use on a phone device as progress was stored from one session to the next.

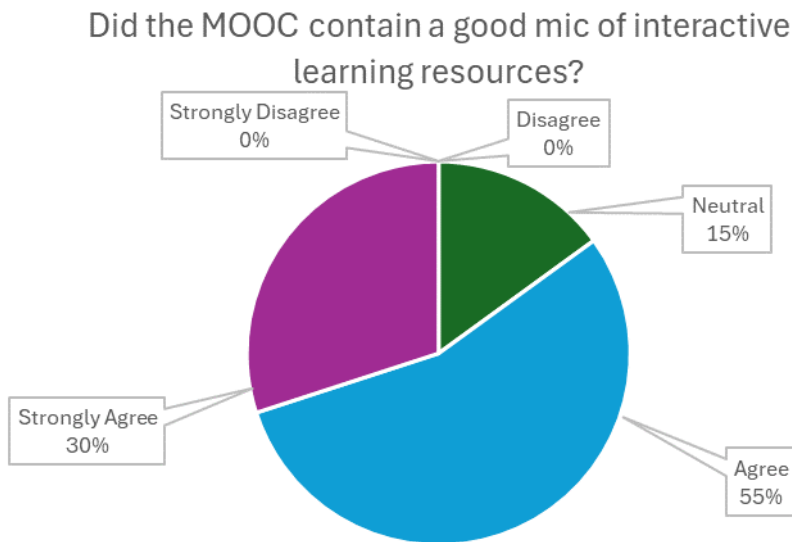


Figure 26: Completed MOOC participants view on the interactive learning resources.

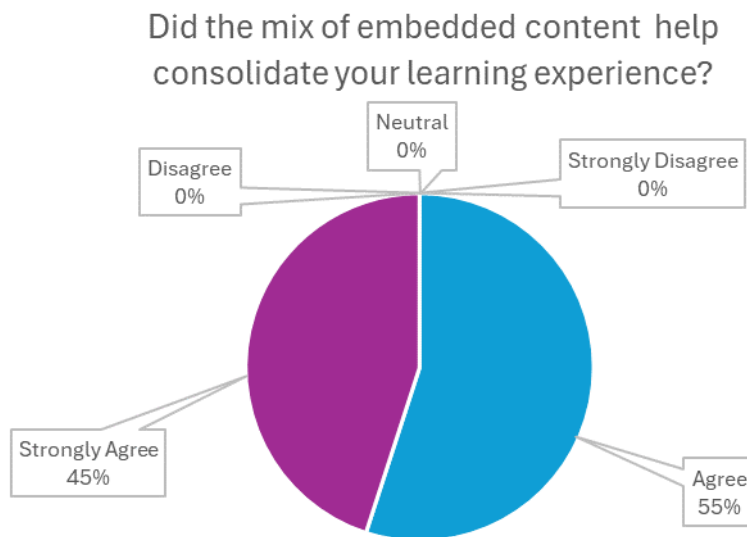


Figure 27: Completed MOOC participants view on the embedded content.

The final question asked participants about the overall MOOC experience, here are some below.

Consultant working in National Government in Romania: it was an extraordinary learning experience.

Environmental/Engineering Consultant in Switzerland: I think it's a great MOOC, that's the perfect amount of technical information and a great overview of a large topic

Environmental/Engineering Consultant in Colombia: I really think that this course helped me by giving me the knowledge that i need for the current project that I'm working on. I thinks its very important to me the opportunity of having access to free education and not seeing money as a limit, because i really imagine my professional life as a chance for building a change and this course encouraged me to believe that green cities and a sustainable future is possible. Thank you so so so much.

Practitioner /Consultant working in local government in England: This was one of the best courses I have ever completed. It was so engaging, detailed, comprehensive and thorough - I must admit I was expecting it to be more entry level so I was very pleased that it wasn't as despite having 15 years experience in FCERM I learnt so much and consolidated and compounded a lot of knowledge in some areas, whilst learning loads on topics I knew very little about. I've noted there is a round 2 coming and I will be strongly suggesting all of my colleagues and managers complete this.... so will be looking forward to the release of round 2!

Non-academic working in an NGO in the Netherlands: This is the most thorough MOOC I have seen. There are many things to learn from it and use in your own area.

3.5 Changes to be made RECONNECT MOOC#2

From the feedback gained the MOOC will undergo a second round of edits, this will include aspect that were deemed to be missing in the current version along with general suggestions/improvement.

The below is a summary of what will be changed, due to the feedback received.

1. Option to learn in Spanish as well as English – this will also increase potential students from Central and South America.
2. Recommended reading will be reduced to a couple of the key papers (per module), with an optional further reading section at the end – Key issue raised among participants.(Figure 28).
3. Grammar and spelling will be rechecked. And complicated sections of text simplified (Figure 21).
4. In modules that are text heavy to try and provide a more interactive learning experience. Option of more Youtube video and Hotspot images/Flipcards.
5. Where possible some examples of detailed modelling techniques for NBS will be given.

6. Cant be done in RECONNECT MOOC#2, but as the MOOC is hosted by UNEXE the MOOC, in the future, will be modified to enable the content to be expanded and cover NBS solutions not just directly related to water and flooding but also NBS solutions for small catchment areas. i.e. taking in information gathered by the NATALIE project (Grant agreement ID: 101112859). <https://www.natalieproject.eu/>
7. Provide NBS examples from outside of Europe and within developing countries.
8. Create an interactive pdf version or publication summary of the MOOC, to present the material used within the course, giving access to the content after the course has finished. This will also help to prolong RECONNECT legacy.
9. As only 20 participants completed the MOOC in the 6 weeks – the length needed to complete the content needs to be extended to reflect the learning resources provided. I would suggest 9-12 weeks depending on how much the current the content is edited.

Was the amount of extended reading content suitable?

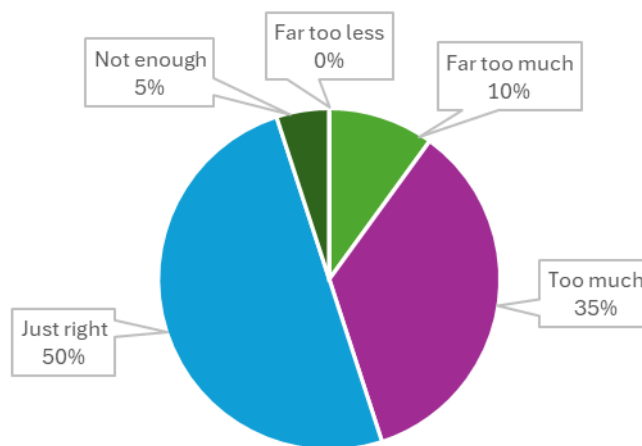


Figure 28: Participants view on the amount of extended reading.

Two comments that were made which maybe worth addressing directly include:

“...some questions are very difficult and we can't complete the course. It should be mandatory to complete only some %

“...It would be more useful to start each module with an introductory video lecture of 10 to 15 minutes duration.

In response the latter comment, yes an introduction lecture would be a good idea and perhaps for Module 1 we can direct users / embedded the first Webinar from the RECONNECT project and highlight that they should listen to “Nature-Based Solutions: Introduction and policy frameworks, by *Zoran Vojinovic, IHE Delft*”. This presentation last 15minutes [and can be found here](#). As for the first we set the pass rate for each module to be 90% without which participants couldn't progress onto the next module. I am reluctant to change this dramatically due to limitations of high drop out rates mentioned by (Brahimi and Sarirete, 2015; Li, 2019) with some students only making use of parts of a course which is of interest to them, and not competing the entire course.

Also, clearly though the questions were difficult they weren't too difficult as the participant managed to pass the course. However, changes could be made to some of the question formats that were not popular for example "Fill in the Blanks" and the questions that involved mathematical equations calculations. Nevertheless 25%/55% of participants strongly agreed/ agreed that the questions were appropriate to the learning material (Figure 29), so no major changes are needed.

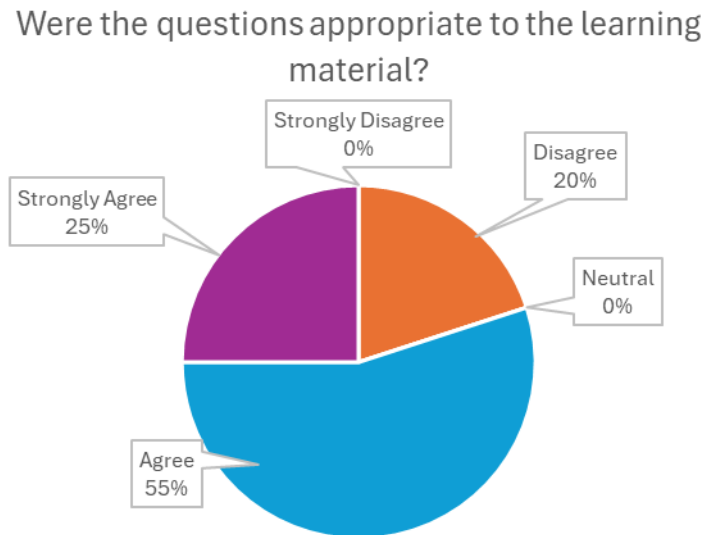


Figure 29: Participant view on questions use in the MOOC assessment

Changes to be made to specific suggested modules include:

1. Module 3.1 to limit the number of definitions at the beginning and a greater focus on the RECONNECT matrix of tools and what you might use them for.
2. Module 2 (MCA specifically) make less complicated more engaging.
3. Drought Risk and Groundwater management – Will be made more visual and built upon.
4. Reduce the material within Module 5 – condense and combine section 1 and 2. i.e. reduce the number of case studies in the Enabling section.
5. Module 5 – add how can the tools proposed can be related to other projects other than RECONNECT.
6. The mathematical concepts of TEV, Willingness to pay and annual amenity values were complicated (coming from a non-STEM background). Could a video lesson walking through an example on a whiteboard be added?

4 Conclusions

In conclusion, a MOOC was created as a way to disseminate the findings of the RECONNECT project. The MOOC brought together a number of experts within the consortium to share their knowledge and create content. Developed by the UNEXE the MOOC targeted non-academics; researchers, practitioners, and policy makers. With the aim that the 6 modules would help participants critical knowledge and skills to identify adequate NbS and estimate their effectiveness to cope with potential hydrometeorological hazards to build a climate resilient community. Using SCORMS and embedded content such as direct links to Journals and youtube videos helped make the learning experience as interactive as possible. Initial results from the MOOC suggest that it was a success with 166 participants across officially starting the MOOC on the 16/09/2024 with only 9 drop outs, and 20 participants completing within the 6 weeks (16/10/2024). The feedback received so far has been very positive "...This was one of the best courses I have ever completed. It was so engaging, detailed, comprehensive and thorough...". The MOOC also reached its target audience with the majority describing themselves as Researchers (28%), Engineering (15%) and Environmental (13%) consultancy and postgraduate students (15%) were also identified along with NGOs (8%) and or local/National Government. The spatial location of participants varied but the majority were from Europe or central America. The most popular module was module 4 "Monitoring and Evaluation of NbS" and the least favourite were modules 3 "Co-creation and integrated design of NBS" and 5 "Barriers, Enablers and Innovation within NBS" mainly due to the content being difficult to understand/complex. A number of improvements can be made to the MOOC#2. Key improvements that will be made to the future version include; (i) the recommended reading will be reduced to a couple of key papers, with optional reading provided at the end of each module; (ii) In modules that are text heavy or complex provide a more interactive learning experience and simplify the language used; (iii) Provide the learning experience also in Spanish increase the student potential to be more inclusive especially to Central and South American countries; (iv) to continue the RECONNECT legacy an interactive pdf of publication of the MOOC content should be created giving participants continued access to the course. Finally, the content with modified expanded to cover NBS solutions not just directly related to water and flooding but also NBS solutions for small catchment areas. i.e. taking in information from other EU projects and from developing countries.

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