

Capacity-building and networking events for nature-based solutions and re-naturing in Malta

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Abstract

Nature-based solutions (NbS) have the potential to build climate resilience and tackle key societal challenges while also providing multiple co-benefits to biodiversity and human well-being. The demand for nature-based innovation is strongly felt in Malta – a small island state, with the highest population density in the European Union. Against this background, the Horizon 2020 project ReNature (Promoting research excellence in nature-based solutions for innovation, economic growth and human well-being in Malta) has the goal to enhance research excellence of the Malta College of Arts, Science and Technology (MCAST), as well as the national research, policy, business and stakeholder community. The six strategically designed training activities fostering capacity-building and research excellence, delivered during the first half of the project, resulted in useful learning outputs. These are twelve presentations, available as attachments to this article, which cover a large scope of topics related to the implementation of NbS. At a later stage, ReNature will publish another round of learning outputs, resulting from the rest of the training activities planned within the scope of the project.

Keywords

biodiversity, ecosystem services, nature-based solutions, sustainable development, sustainable development goals, urban ecology

Introduction

Nature-based solutions (NbS) have the potential to build climate resilience, tackle key societal challenges and provide multiple co-benefits to biodiversity and human well-being. The demand for nature-based innovation is strongly felt in Malta, a small island state with the highest population density in the European Union. The country has over the past years gone through strong tourism and economic growth but at the same time is highly vulnerable to climate change and has limited natural resources. The implementation of nature-based solutions creates therefore an opportunity to improve resilience and to foster adaptation to climate and environmental changes, the latter including rapid urbanisation and the steep growth in demand for energy and water resources.

Against this background, the aim of the capacity-building activities carried out within the first 18 months of the Horizon 2020 project ReNature (Promoting research excellence in nature-based solutions for innovation, economic growth and human well-being in Malta) was to enhance the institutional research capacity and to develop stronger links between research, policy, and the business and stakeholder community. As such, the project is helping to position Malta as a front-runner country in research and innovation, and in the generation of novel NbS that tackle environmental challenges faced by modern societies. The ReNature consortium and the research community within which it is anchored seek to promote capacity building and have identified a number of learning outcomes that are considered as being important in the field of NbS. This training is delivered through the coordination of specific modular trainings in topics related to the key areas of this concept.

Six strategically designed training activities were delivered during the first 18 months of the project. These trainings have focused on the complex problems that are present in human-dominated environments, including the effects and impacts of urbanisation, such as rapidly emerging and changing landscapes in the areas of rural-urban interface. Cultural landscapes and the related complex social and environmental issues call for a rethinking of traditional landscape planning and management approaches in the twenty-first century. Participants had the possibility to interact and share experiences and activities with experts from the research and practitioners' community during the practical and theoretical sessions that were carried out within each training and networking event.

The ReNature training courses were aimed at providing trainees with an understanding of the potential of nature-based solutions in cultural landscapes, in the context of the holistic approach towards achieving the Sustainable Development Goals. This has allowed the trainees to discuss the importance of NbS and demonstrate that they have the necessary skills and knowledge to identify and apply NbS in different contexts. The training courses included "problem-based" learning sessions, aiming at the stimulation of professional

development and further cooperation among participants. All training modules were delivered in English.

The training courses participants identified societal challenges that would benefit from the adoption of NbS, described appropriate NbS to address such challenges across a rural-urban gradient, evaluated the benefits of mainstreaming NbS through the use of tools and knowledge synthesis, and described the links between green infrastructure and human health in urban areas. In addition, trainees learnt how to assess the impact of ecosystem structure and function on the delivery of regulating ecosystem services. Trainees carried out field-based work and actively engaged in discussions on selected case-studies in order to obtain important first-hand experience in this field and understand how ecosystem service knowledge can be applied in planning and design-making to support the design of NbS. Moreover, the participants were also trained in communicating scientific content in an engaging and impactful way. Furthermore, during group works, oral presentations and science communication sessions, they tested different approaches to communicate concepts and key information about NbS and sustainability.

Aim of the training events

The aim of the training events was to exchange knowledge, build capacity and promote research for the NbS implementation.

Date and place

A total of six consecutive capacity-building events were held between 1st September 2018 – 29th February 2020:

- **ReNature workshop on knowledge needs for the use of nature-based solutions** was held at the Institute of Applied Sciences, Malta College of Arts, Science and Technology (MCAST), Paola, Malta, 7th May 2019;
- **ReNature Ecosystem Services and Green Infrastructure - Training Course 1: Techniques and methods in biodiversity and land monitoring** was held at the MCAST Main Campus, Paola, Malta, 7th – 9th May 2019;
- **ReNature Nature-based Solutions Training Course 2: Mainstreaming nature-based solutions in planning and policy-making** was held at the Museum Building, Trinity College Dublin, Dublin, Ireland, 11th – 13th June 2019;
- **ReNaturing Cities: Interdisciplinary Summer School, Nature-based solutions in landscape management** was held at the Archbishop's Seminary, Tal-Virtu, Rabat, Malta, 30th September – 4th October 2019;
- **ReNature Training Course 3: Nature-based Solutions in Urban Planning** was held at the Department of Sociology and Social Research, University of Trento, Trento, Italy, 5th – 7th February 2020;

- **ReNature Training Course 4: Nature-based Solutions in Rural Landscapes** was held at the Institute of Applied Sciences, MCAST Main Campus, Paola, Malta, 24th – 25th February 2020.

List of Trainers

For these training and networking events, we brought together 28 mentors and speakers from the ReNature consortium and the research and practice community across Europe (Table 1).

Table 1. List of Trainers	
Name	Organization
Balzan, Mario V.	Malta College of Arts, Science and Technology, Malta
Dicks, Lynn V.	University of Cambridge, United Kingdom
Collier, Marcus	Trinity College Dublin, Ireland
Geneletti, Davide	University of Trento, Italy
Grace, Miriam	University of Cambridge, United Kingdom
Tomaskinova, Judita	Malta College of Arts, Science and Technology, Malta
Longato, Davide	University of Trento, Italy
Sapundzhieva, Anna	Pensoft Publishers Ltd., Bulgaria
Calleja, Eman	Malta College of Arts, Science and Technology, Malta
Zerafa, Steve	Malta College of Arts, Science and Technology, Malta
Łowicki, Damian	Adam Mickiewicz University in Poznań, Poland
Lennon, Mick	University College Dublin, Ireland
McIntyre, Tadhg	University of Limerick, Ireland
Harris, Maryann	Dublin City Council, Ireland
O'Malley, Vincent	Transport Infrastructure Ireland
Sweeney, Noel	Sweeney Associates, Ireland
Cortinovia, Chiara	Lund University, Sweden
Adem Esmail, Blal	University of Trento, Italy
Kato Huerta, Jarumi	University of Trento, Italy
Orta Ortiz, Susana	University of Trento, Italy
Giovannini, Lorenzo	University of Trento, Italy

Falco, Enzo	University of Trento, Italy
Segura, Lorena	Mediterranean Wetland Observatory, Tour du Valat, Arles, France
Alcantara, Andres	IUCN Malaga, Spain
Marini, Simone	Institute of Life Sciences, Land Lab., Pisa, Italy
Biesmeijer, Koos	Naturalis Biodiversity Centre Leiden, Netherlands
Fürst, Christine	Martin-Luther University Halle Wittenberg, Germany
Theochari, Dimitra	MSB Landschaftsarchitekten Hamburg, Germany; COST Action Circular City, National Technical University, Greece

These training courses involved the participation of 137 trainees from 22 countries (Fig. 1), including early-career practitioners, postgraduates, MCAST staff and relevant stakeholders working in Malta.



Figure 1. [doi](#)

Nationality of the training events' trainees.

Key outcomes and discussions

The training activities were geared towards enabling the research team from the coordinating institution (MCAST) to upscale its research capacity and develop collaborations. Training events included sessions that developed and understanding of the basic concepts and the tools for mapping and assessing biodiversity, green infrastructure and ecosystem services. Additionally, opportunities and challenges associated with mainstreaming NbS in an urban and rural context were also covered. All six courses have included a strong practical element and have included the use of technology (e.g. mobile app, geographical information systems, drone usage), group work to facilitate interactions, during field visits and problem-solving sessions.

In parallel with the ReNature 1st Training Course, a thematic workshop was held with stakeholders, representing organisations from spheres which include business, national and local government, government-associated entities, and research, from Malta and other Mediterranean islands, to assess practitioners' knowledge needs related to NbS. A collaborative, multi-stakeholder exercise to identify priority knowledge needs that could enhance the uptake of NbS in Mediterranean islands started on the 5th April 2019 and was concluded on the 7th May 2019. This took the form of a three-round knowledge synthesis led by the University of East Anglia, with the workshop component (Round 3) hosted at MCAST (Fig. 2) and scientific input to the discussions. Discussions were chaired by an experienced facilitators (Lynn Dicks and Miriam Grace). We used a well-established iterative prioritisation method based on a modified Delphi process to minimise bias. Neither the facilitators, nor the ReNature researchers voted or scored.



Figure 2. [doi](#)

Prioritisation of knowledge needs at a collaborative workshop.

- We identified 47 priority resulting knowledge needs in rank order, classified according to whether they can be addressed by knowledge synthesis and further research, or demand action in policy and practice. The top priority knowledge needs were (i) greater clarity on definitions and scope of the NbS concept; (ii) which NbS are adapted to dry Mediterranean conditions and minimise irrigation needs?; and (iii) how to increase uptake of NbS into urban plans. Other priority knowledge needs included the modification of new or existing buildings and built-up areas to accommodate green infrastructure, and cost-benefit analyses of the creation of green urban spaces. In collaboration with these stakeholders, the findings will determine future research strategies on NbS implementation in the Mediterranean islands Grace et al. (In Press).

The **ReNature 1st Training Course** was focused on topics related to biodiversity and land monitoring. The course also included fieldwork and a hands-on activity, aimed at the collection of data for mapping green infrastructure and tree diversity in an urban area, by

using an app specifically developed for the project, namely the ReNatureTreeMap app (Fig. 3). The task for participants was (i) to plot and analyse the data collected during the fieldwork session, working in groups and using GIS tools, and (ii) to present the data that they have collected, plotted, and analysed during a dedicated session.



Figure 3. [doi](#)

The ReNatureTreeMap app and Tree dataset generated by participants during the Training course 1.

By the end of the course, the trainees were able to:

- Select the appropriate ecosystem service mapping and assessment method/approach for a specific purpose and justify the selection;
- Explain what 'green and blue infrastructure' is in rural, urban and coastal environments;
- Map green infrastructure at an appropriate scale.

The **ReNature 2nd Training course** was focused on mainstreaming NbS in planning and policymaking. During the field excursion, participants were introduced to working examples of NbS in new urban infrastructure projects. Subsequently, they had to design a NbS approach for a selected case study to address problems typically occurring in urban areas, by incorporating some of the lessons learnt from policymakers and practitioners.

The skills that were developed included:

- Analytical skills – field identification of NbS, critically assessing their likelihood of success in a real-world scenario, discussing their co-benefits, and establishing their sustainability potential (management, efficacy, and linkages in a city setting);
- Design and practice skills – identifying the limitations of mainstreaming NbS, proposing methods of providing nature-based solutions within restricted scenarios, and role-playing scenarios for engaging with stakeholders (Fig. 4);
- Presentation skills – communicating NbS at different societal levels.



Figure 4.

Identifying the limitations of mainstreaming NbS within restricted scenarios.

The **First ReNaturing Cities Interdisciplinary Summer School** was organised in collaboration with the COST Action Circular City. Around half of the participants were selected to receive a COST Circular City grant by a group of experts from the ReNature consortium and the COST Circular City. This training was carried out through 18 learning sessions and was accredited by MCAST at 2 ECTS. Participants learnt how to assess the impact of ecosystem structure and function on the delivery of regulating ecosystem services and carried out field-based work in two case studies (an urban area and the island of Comino), while actively engaging in discussions for selected case-studies (Fig. 5). Henceforth, the attendants obtained important first-hand experience in this field and understood how ecosystem service knowledge can be applied in planning and design-making to support the design of NbS. In particular, during the hands-on activities, participants had to identify potential solutions to address the main challenges identified in the two case studies, by using the concept of NbS (Fig. 6). Thereupon, they had the possibility to present their group works on the case studies to the experts and mentors, and to receive feedback.



Figure 5.

Fieldwork in an urban (Birkirkara) and rural (Comino) case-studies.



Figure 6. [doi](#)

Summer school group work presentation.

Upon completing the summer school, learners were able to:

- determine societal challenges and identify nature-based solutions to address them;
- evaluate the benefits of mainstreaming nature-based solutions and describe links between green infrastructure and human health;
- assess the impact of ecosystem structure and function for regulating ecosystem services;
- recognise how ecosystem service knowledge can be applied in urban planning decision-making, and
- communicate scientific content in an engaging and impactful way.

The **ReNature 3rd Training course** was focussed on NbS in urban planning and carried out through 10 learning sessions (of which 3 concerned group work and presentations, Fig. 7). The group work involved the development of a planning proposal for one or more specific case study sites by including mixed NbS-residential development. Participants were asked to present and describe the rationale of their planning proposal, the related spatial development strategy, and the expected impacts, advantages and limitations.

The training activities upskilled participants in:

- Understanding the ecological foundations of NbS;
- Assessing their impacts on ecosystem services and their socio-economic implications;
- Identifying planning barriers and opportunities;
- Applying key principles for NbS design to target specific urban needs and challenges through assigned case studies.

The **ReNature 4th Training course** focused on the implementation of NbS in rural landscapes. A practical demonstration was carried out to assess the use of drones and

explore their various benefits in monitoring the environment, while gaining knowledge and insights on the environmental and agricultural characteristics, and acting pressures (Fig. 8). During this practical session, the evaluation of the benefits of using drones for monitoring vegetation and other environmental data was presented.



Figure 7.
Group work on NBS design in urban planning.



Figure 8.
Practical demonstration of drone usage in monitoring the environment.

By the end of the course, trainees were able to:

- Define nature-based solutions and provide an overview of ongoing initiatives in the Mediterranean region;
- Assess the demand for nature-based solutions based on environmental monitoring and socio-economic data;
- Identify nature-based solutions and interventions that may be applied in rural landscapes to provide co-benefits to human well-being and biodiversity;

- Select the appropriate nature-based solution to address a specific societal challenge within a rural landscape.

Learning outputs

Attached to this article, there is a set of training materials resulting from the above listed events. They will be complemented by a second article, linking to the rest of the key outputs presented in upcoming training activities of ReNature.

List of presentations:

1. *Biodiversity, green infrastructure and ecosystem services: an introduction* (Trainer: Mario V. Balzan, MCAST, Malta); Suppl. material 1
2. *Tree biodiversity: an introduction to species diversity and identification in Malta* (Trainer: Eman Calleja, MCAST, Malta); Suppl. material 2
3. *Case-study: Ecosystem Services in Polish Urban Areas* (Trainer: Damian Łowicki, Adam Mickiewicz University in Poznań, Poland); Suppl. material 3
4. *Using evidence in decision-making* (Trainer: Lynn Dicks, University of Cambridge, University of East Anglia, UK); Suppl. material 4
5. *The ecological foundations: biodiversity and its relationship to ecological function* (Trainers: Lynn Dicks, University of Cambridge, University of East Anglia, UK; Mario V. Balzan, MCAST, Malta); Suppl. material 5
6. *Designing NbS in cities: What do planners need to know?* (Trainers: Davide Geneletti, University of Trento, Italy; Chiara Cortinovis, Lund University, Sweden); Suppl. material 6
7. *Nature-based solutions and environmental justice* (Trainer: Jarumi Kato Huerta, University of Trento, Italy); Suppl. material 7
8. *Nature-based solutions: not just a city thing!* (Trainer: Marcus Collier, Trinity College Dublin, Ireland); Suppl. material 8
9. *Management and restoration of Mediterranean wetlands to provide ecosystem services and benefits* (Trainer: Lorena Segura, Mediterranean Wetland Observatory, Tour du Valat, France); Suppl. material 9
10. *How can we save bees through sustainable farming?* (Trainer: Simone Marini, Institute of Life Sciences, Italy); Suppl. material 10
11. *Identifying priority knowledge needs for implementing nature-based solutions in the Mediterranean islands: results from the Malta and other Mediterranean Islands* (Trainer: Miriam Grace, University of Cambridge, University of East Anglia, UK); Suppl. material 11
12. *Non-material ecosystem benefits of Protected Areas as a bridge to future challenges in Sustainable Development* (Trainer: Judita Tomaskinova, MCAST, Malta). Suppl. material 12

Conclusions

The training events have created a space for open and inspiring discussion among project partners, academics, practitioners and relevant stakeholders, complementing the establishment of a national NbS research and innovation cluster. These training activities have managed to bring together a strong stakeholder community, which together with the ReNature Twinning collaboration, is working to develop the scientific, technical and research capacities to implement NbS in practice. This NbS cluster will help to further enhance the support and coordination given by ReNature for improving the national participation in Horizon 2020 projects on NbS.

In the second half of its timespan, the ReNature project has planned additional training and capacity-building activities that will foster research excellence at the participating institutions. These shall consist of one advanced scientific online training course, focusing on collaborations across the science-policy interface for NbS, and a second PhD training school, focussing on designing NbS. The project will publish another round of learning outputs resulting from these upcoming activities.

Acknowledgements

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References

- Grace M, Balzan M, Collier M, Geneletti D, Tomaskinova J, Abela R, Borg D, Buhagiar G, Camilleri L, Cardona M, Cassar N, Cassar R, Cattafi I, Cauchi D, Galea C, La Rosa D, Malekkidou E, Masini M, Portelli P, Pungetti G, Spagnol M, Zahra J, Zammit A, Dicks LV (In Press) Priority knowledge needs for implementing nature-based solutions in the Mediterranean islands. *Environmental Science & Policy*.

Supplementary materials

Suppl. material 1: Biodiversity, green infrastructure and ecosystem services: an introduction [doi](#)

Authors: Balzan, M.

Data type: Presentation

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Suppl. material 2: Identification of trees in a Maltese urban context [doi](#)

Authors: Calleja, E.

Data type: Presentation

[Download file](#) (38.20 MB)

Suppl. material 3: Ecosystem services in Polish urban areas [doi](#)

Authors: Łowicki, D.

Data type: Presentation

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Suppl. material 4: Using evidence in decision-making [doi](#)

Authors: Dicks, L.

Data type: Presentation

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Suppl. material 5: The ecological foundations: biodiversity and its relationship to ecological function [doi](#)

Authors: Dicks, L., Balzan, M.

Data type: Presentation

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Suppl. material 6: Designing NbS in cities: What do planners need to know? [doi](#)

Authors: Geneletti, D., Cortinovis, C.

Data type: Presentation

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Suppl. material 7: Nature-based solutions and environmental justice [doi](#)

Authors: Huerta, J. K.

Data type: Presentation

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Suppl. material 8: Nature-based solutions: not just a city thing! [doi](#)

Authors: Collier, M.

Data type: Presentation

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Suppl. material 9: Management and restoration of Mediterranean wetlands to provide ecosystem services and other benefits [doi](#)

Authors: Segura, L., Thibault M.

Data type: Presentation

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Suppl. material 10: How can we save bees through sustainable farming [doi](#)

Authors: Marini, S.

Data type: Presentation

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Suppl. material 11: Identifying priority knowledge needs for implementing nature-based solutions-results from Malta and other Mediterranean islands [doi](#)

Authors: Grace, M., Dicks, L.

Data type: Presentation

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Suppl. material 12: Non-material ecosystem benefits of protected areas as a bridge to future challenges in sustainable development [doi](#)

Authors: Tomaskinova, J.

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