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Integrating Nature-Based Solutions into Higher Education towards exploiting the transformative potential of Social Economy for a green and inclusive future

WP2 Developing a study for embedding NBS in SE related studies:

"Integrating NBS in SE studies"

UNIZG, 2023

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1. INTRODUCTION

This State of the Art Report is an outcome of the international project "Integrating Nature-Based Solutions into Higher Education towards exploiting the transformative potential of Social Economy for a green and inclusive future" (acronym: “SEgoesGreen”), funded by the European Commission under the Erasmus+ programme Call 2022 Round 1 KA220-HED - Cooperation partnerships in higher education. The project is led by RZESZOWSKA AGENCJA ROZWOJU REGIONALNEGO SPÓŁKA AKCYJNA (Poland).

All project partner institutions actively contributed to the creation of this report. The participating institutions include RZESZOWSKA AGENCJA ROZWOJU REGIONALNEGO SPÓŁKA AKCYJNA (Poland), HUB 21 (Greece), UNIWERSYTET PEDAGOGICZNY IM. KOMISJI EDUKACJI NARODOWEJ W KRAKOWIE (Poland), UNIVERSITY OF MACEDONIA (Greece), SYNTHESIS CENTER FOR RESEARCH AND EDUCATION LIMITED (Cyprus), UNIVERSITY OF ZAGREB (Croatia) and ZERO - Associação Sistema Terrestre Sustentável (Portugal).

This report is part of project’s work package two, with the University of Zagreb (UNIZG) taking the lead role in its development. The introductory chapter provides an overview of the report's purpose, explains the process of its development, and outlines its structure.

1.1. Purpose of the Study

Most of the existing education programs focus on “learning about green transition”, as they mainly cover the theoretical concepts of environmental sustainability and climate change and follow a narrow educational approach that does not incorporate practical and experiential learning opportunities and thus fails to fully familiarize students with the environmental potential that social economy enterprises (SEEs) carry.

Nature- based solutions (NBS) hold significant potential for addressing various sustainability challenges, inducing climate change mitigation, biodiversity enhancement and improved environmental quality, while also contributing to economic and societal well-being. Despite the momentum NBS have gained in the last years, they are still considered as a new concept with a highly unexploited educational potential. This is related to the absence of knowledge about how to integrate NBS in education along with the scarce affordance of practical training resources. To this end, the mission of this study is to develop the currently missing knowledge on NBS integration, particularly for SE departments of European HEIs.

The **main goals** of this study are to provide:

- Examples of good practices and elaboration on the importance of integrating sustainability education powered by NBS in SE faculties,
- Comprehensive educational philosophy to support the integration of NBS in SE faculties, including concrete strategies (pedagogical approaches underpinning use of NBS in HEIs),
- Analysis of the practical aspects of the adoption of NBS learning in HEIs, including opportunities and challenges, i.e., conditions that foster and, on the other side, limit the adoption of NBS learning in HEIs,
- Elaboration on possibilities of overcoming the challenges in NBS oriented learning approach integration in HEIs (to be able to support more systemic integration of NBS into current SE HEI's curricula further along the project deliverables).

Thus, this study aims to develop a comprehensive framework for integrating environmental sustainability education through an NBS – oriented approach in social economy (SE) faculties.

It provides comparative insights into the ways in which HEIs, and especially SE departments, shape effective pathways for integrating active learning in environmental sustainability and NBS in their settings. Its particular value is in addressing the needs of HEI's educators and education researchers for understanding the use and educational value of NBS as a more effective alternative to traditional environmental education. Thus, it establishes a solid base for designing and integrating innovative NBS-oriented educational programmes in SE HEIs.

1.2. Process and development of the Study

To develop this comprehensive study aiming to support the integration of NBS in SE faculties, a set of activities was conducted:

1. Partners started by designing a solid **research and analytical framework** that set the basis for exploring the emerging field of NBS integration in HEIs.
2. Mapping and desk research activities were performed to collect **good practices and explore the pedagogical approach underpinning the use of NBS and eco-citizenship** in the higher education context.
3. **Case studies** were developed to support in-depth knowledge on **best practices of using NBS in HEIs** across project partner countries and explore the barriers and opportunities to embed sustainability education powered by NBS in SE faculties.
4. Findings were synthesized into this study draft and presented during consultation workshops organized within partner universities to receive feedback. Participating educators' feedback will be included in the final version of study.

The development of the research methodological guide provided common working definitions, guided the mapping and desk research activities, together with the selection criteria used and the analytical methods applied. Mapping focused on project partner countries, where it provided a set of best practices for NBS in HEIs whose insights are found valuable for embedding NBS in SE faculties. It aimed to find as much as possible diverse, meaningful action-oriented environmental education practices based on NBS, which focus on "learning for the green transition", thus addressing climate change through empowering the future generation of social entrepreneurs to take environmental actions within their communities.

Desk research included analysis of co-existing eco-citizenship practices in SE HEIs that go beyond NBS and offer the identification of relevant learning objectives and outcomes that can feed into SE HEIs educational programmes to support the development of active sustainability skills. Furthermore, eight in-depth case studies were developed to showcase effective integration of NBS across HEIs. The development of case studies included the organization of interviews with stakeholders involved in the implementation of identified NBS practices to elicit useful information on these practices, factors, and conditions affecting their effectiveness and impact on education.

1.3. Structure of the Study

This report consists of five chapters. After the introduction, which outlines the main aim, the development, and structure of the State of the Art Report, the second chapter presents an overview of the sustainability challenges facing the modern world and highlights the importance of NBS and eco-citizenship in addressing these issues. It also provides a theoretical framework with definitions and elaboration of various types of NBS and eco-citizenship, offering many examples to establish a sound theoretical foundation for the study. Additionally, it includes a theoretical framework of social economy and related terms. Furthermore, the report analyzes different types of education for sustainable development and distinguishes NBS in this context while providing elaboration on the pedagogical approaches for teaching NBS.

The third chapter focuses on NBS best-practices in partner countries HEIs', providing an overview of its current integration within the educational systems in partner countries. The chapter incorporates not only best practices from SE faculties but also from non-SE faculties, which can provide valuable information for enhancing the integration of NBS within the framework of SE faculties. Best practices are distinguished according to the *thematic focus of NBS,* such as: NBS related to climate change mitigation and adaptation, water management, waste management, biodiversity management, air quality, and urban regeneration. These

insights are used to select the best practices, which are thoroughly presented through case studies in Chapter five. This chapter is complemented by the Repository available in Appendix 1, which will also be available in a table form on the project's website.

The fourth chapter provides an overview of existing eco-citizenship best-practices in partner countries HEIs. It includes best practices from SE HEIs that go beyond NBS but offer the identification of relevant learning objectives and outcomes that can feed into SE HEIs educational programmes to support the development of active sustainability skills. Also, this chapter provides contextual factors that influence its integration into the curriculum program.

The fifth chapter provides eight case studies that present a thorough analysis of best practices mapped in partner countries. These case studies offer a deeper understanding of how HEIs and particularly their SE departments, incorporate active learning in environmental sustainability and Nature-Based Solutions (NBS) within their setting. These studies cover various aspects, including elaboration of innovative sustainability education practices especially in SE faculties, providing overview of diversity of pedagogical approaches used, outlining interdisciplinarity and trans-disciplinarity challenges, and effective strategies to overcome these challenges.

The concluding section includes a summary of key findings of the study. It will be further enriched by the input of educators who will participate in consultation workshops.

2. THEORETICAL FRAMEWORK

This chapter provides an overview of the sustainability challenges facing the modern world and highlights the importance of NBS and eco-citizenship in addressing these issues. Furthermore, it provides a theoretical framework with definitions and elaboration of various types of NBS and eco-citizenship, offering many examples to establish a sound theoretical foundation for the study. Additionally, it includes a theoretical framework of social economy and related terms. Furthermore, the report analyses different types of education for sustainable development and distinguishes NBS in this context while providing elaboration of the pedagogical approaches for teaching NBS in HE.

2.1. Sustainability Challenges of The Modern World

Recent decades have brought numerous **socio-economic challenges** through increasing globalisation, the development of industry, increasing urbanisation and demographic transition.

While environmental scientists have long been discussing the planetary effects of economic

activities, in the 1970s, awareness of climate change and its importance started to rise. This was especially prominent since the 1972 UN conference in Stockholm, where concern over the sources of minerals and limber started to rise yet did not acknowledge the real ecological threats (Sachs, 2015). A wave of international environmental activity in the 1970s was focused on local, acute, and relatively reversible forms of pollution (e.g., oil spills, dumping hazardous wastes at sea) by regulating certain pollutants, while the further cycles of environmental activity were more concerned with long-term irreversible global threats (e.g., loss of biological diversity, greenhouse warming, etc.) (Bodansky, 2001).

Environmental activity widely started in 1987 with the discovery of the stratospheric ozone hole and publication of "Our Common Future", while UNC Conference on Environment and Development further stressed its importance (Bodansky, 2001). So, in the 1980s, climate change was transformed from scientific to a policy issue. This can be partly attributed also to the presence of certain topics in the mainstream media: the discovery of so-called Antarctic ozone hole, North American heat wave and drought of the summer of 1988 (Bodansky, 2001).

So, increasing awareness of the challenges of modern industrial society, especially since the 1980s, has brought **sustainable development to the centre of economic debates** and has fundamentally changed the views of governments and development agencies on environment and development (Pezzey, 1992). "Stern Review" (2006) on the economics of climate change pointed out the need for immediate response to avoid the impacts of climate change connected to the global temperature increase that can affect food, water, eco systems, extreme climate, and risks of sudden and big irreversible changes. This highly influential publication from a former chief economist of the World Bank argued for strong, decisive actions to stabilise greenhouse gases given the risks of the status quo. It stressed some of the most important **policy challenges of moving to a low-carbon global economy**:

- → Carbon pricing - through taxation, emissions trading and regulation,
- → Technology policy – to drive the development and deployment of low-carbon and high-efficiency products,
- → Removing barriers to energy efficiency
- → Informing, educating, and persuading individuals about what they can do to respond to climate change.

So, sustainable development became the central concept of the modern age, which strives to provide purposeful interaction of three complex systems (Sachs, 2015):

(1) **World economy,** which has certain economic goals,

(2) **Global society,** which aims for social goals and

(3) **Earth's physical environment,** which envisions environmental goals.

The goals are not mutually exclusive but are highly interdependent, as shown in Figure 1.

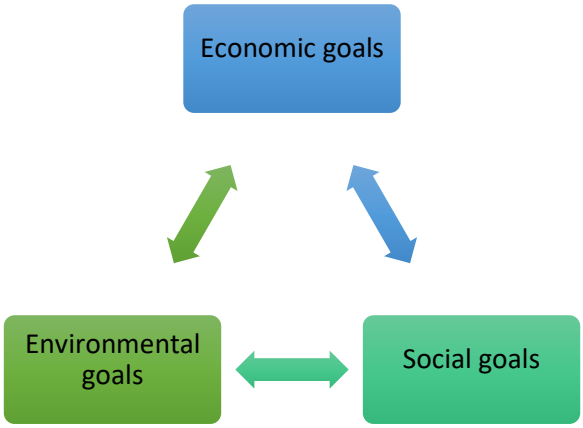

Figure 1 Three goals of modern society

Source: Sachs (2015)

Although countries worldwide have specific objectives of their own, almost all of them acknowledge the importance of **aiming for a combination of economic development, environmental sustainability, and social inclusion**. This led to forming and adopting the United Nations (UN) Millennium Development Goals (MDGs) which provided eight global goals for addressing the concerns of poverty, hunger, disease, schooling, gender inequality, and environmental degradation in the period from 2000 to 2015, which were afterwards reframed and introduced as **Sustainable Development Goals** (SDGs) for the period until 2030 (Sachs, 2012; Sachs, 2015). These goals, listed in Figure 2, **provide a global framework for shaping economic, social, and environmental development**.

Figure 2 UN Sustainable development goals

Source: UN (2023)

Several of these goals aim explicitly at **environmental sustainability** (6, 7, 11, 12, 13, 14 and 15), due to some of the widely recognised **elements of environmental crises** (Sachs, 2015):

- → climate change (resulting from greenhouse gas emissions),
- → environmental pollution,
- → acidification of oceans (mainly due to increased atmospheric carbon dioxide),
- → loss of biodiversity (caused by unsustainable demand of forests),
- → depletion of key fossil resources, including energy and groundwater,
- → rising world population and incomes per person in large emerging economies increase the demand for food.

So, SDGs are intertwined both within categories and among these global challenges, as addressing one of them usually affects at least one other SDG. As Seddon et al. (2020) point out, all UN SDGs are formed to address three central global challenges: protection of biodiversity, mitigating and adapting to climate change, and ensuring human wellbeing, as shown in Figure 3.

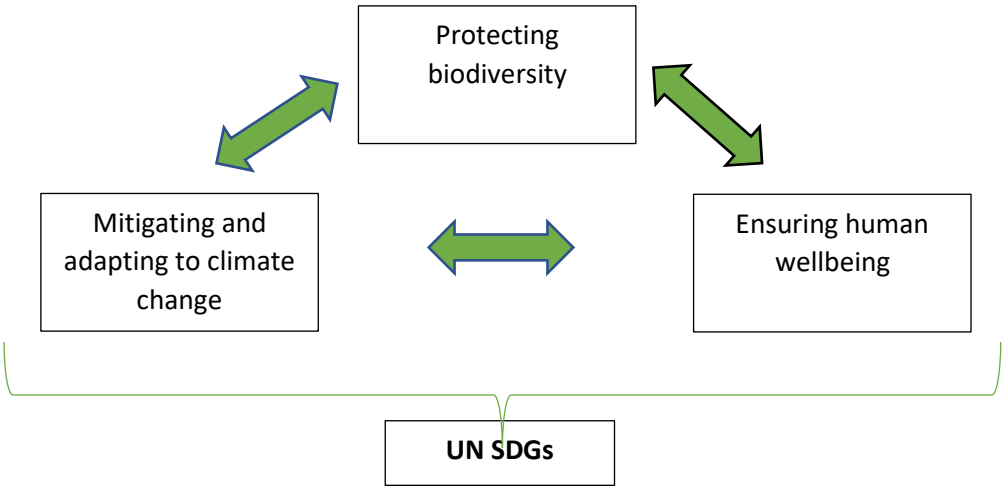

Figure 3 Three central global challenges

Source: Seddon et al. (2020)

Different solutions to address the UN SDGs have emerged, and Nature based solutions to these societal challenges are emerging as integrated approaches that can reduce trade-offs and promote synergies among SDGs (Seddon et al., 2020).

2.2. Theoretical Framework of Nature Based Solutions

Nature can provide various answers to many of the outlined sustainability challenges. NBS concept emerged through the quest of international organisations (such as World Bank) for a solution to work with ecosystems instead of only relying on engineering inventions to addressing sustainability challenges (Mittermeier et al., 2008). So, besides technical solutions, solutions which are **inspired and supported by nature** are able to address these challenges, providing several benefits and simultaneously addressing several sustainable development goals. They include a **range of practices and interventions which utilise natural ecosystems to address socio-economic challenges** (Rice, 2020). These practices are gathered under the term "Nature-based solutions" (NBS).

NBS is a relatively new concept which appeared in the literature at the beginning of 21st century, and there is no unique definition or classification of NBS.

The European Commission defines them as ***"solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic***

benefits and help build resilience". Such solutions are expected to provide more diverse nature and natural features and processes in cities, landscapes, and seascapes through locally adapted, resource-efficient and systemic interventions.

UN similarly defines them as ***"actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits".***

IUCN (membership union of government and civil society organisations) defines NBS as ***"actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits".***

Although these definitions are slightly different, they are clearly similar in pointing to the **environmental, social, and economic benefits of the NBS**. NBS provide certain co-benefits across socio-cultural and socio-economic systems, biodiversity, ecosystems, and climate (Raymong et al., 2017).

As WWF (2023) points out, NBS can address clear societal challenges:

- → water security,
- → food security,
- → human health,
- → disaster risk,
- → climate change,
- → natural and economic development.

European Commission (2023) points out some more detailed targets that NBS can address:

- → biodiversity enhancement,
- → water management,
- → natural and climate hazards,
- → green space management,
- → green jobs,
- → land regeneration,
- → health and well-being,
- → knowledge building for sustainable urban transformation,
- → participatory planning and governance,
- → climate resilience,
- → social justice and cohesion, air quality.

Although these challenges are in the UN SDGs treated separately, in reality, these issues are deeply intersected and are affected by some of the same drivers, so NBS are emerging as an approach which promotes synergies among these SDGs (Seddon, 2020). Some of the examples of NBS to address these challenges (pertaining to certain SDGs) are listed in Table 1, while many more can be outlined.

Table 1 NBS addressing societal challenges

Global societal challenges	SDG addressed	NBS examples
Water security	6	Harnessing water-related services of "natural infrastructure" (forests, wetlands, floodplains)
Food Security	2	Managing wild species (especially fish), providing irrigation water, and protecting wild genetic resources (animal and plants)
Human health & well-being	3,11, 13	Green space (heat regulation, noise abatement, physical activity, etc.)
Natural disasters	11, 13; 1, 2, 3, 6, 15	Forests and wetlands can serve as a protective barrier to natural hazards (hurricanes, tsunamis…)
Climate change	13,	Conservation, restauration and sustainable management of forests, wetlands, and oceans; Natural infrastructure complementing the physical infrastructure

Source: Cohen – Shacham et al. (2016)

It is especially **important to foster NBS in urban areas**, as half of world population lives in cities, which make up 80% of global GDP and are responsible for 70% of CO2 emissions and 75% of natural resource consumption (WWF, 2023). So, managing urbanisation can allow the maximisation of agglomeration benefits while at the same time minimise environmental degradation and other negative impacts of non-controlled urban growth (UN, 2018).

So, NBS are considered to be especially important in urban areas as growing cities are facing numerous challenges, which leads to changing urban economics. Besides population growth, these challenges include resource depletion, climate change, and degradation of ecosystems, which strive to adopt the circular economy concept for resource management (Atanasova et al., 2021). **NBS can be used to address circularity**, which refers to new and inclusive economic

paradigm aiming to minimize pollution and waste, extend product lifecycles, and enable broad sharing of physical and natural assets (UNECE, 2023). Circular economy thus ***"aims to maintain the value products, materials, and resources for as long as possible by returning them into the product cycle at the end of their use, while minimising the generation of waste"*** *(EU, 2022).*

Langergraber et al. (2021) point out the **importance of considering urban circularity challenges**, such as:

- → restoring and maintaining water cycle,
- → water and waste treatment, recovery and reuse,
- → nutrient (nitrogen, phosphorus, potassium) recovery and reuse,
- → material recovery and reuse,
- → food and biomass production,
- → energy efficiency and recovery, and
- → building system recovery.

Climate change and environmental degradation led the EU to form the "European Green Deal", which is the EU's growth strategy aiming to make it climate neutral by 2050, boost the economy through green technology, cut pollution, and create sustainable industry and transport (EU, 2023). To address the issue of inefficient buildings (considered 75% of all buildings), the "New European Bauhaus" initiative strives for the design of buildings which includes sustainability dimensions (including circularity). It strives for tangible change on the ground, on the enabling ecosystem for innovation, as well as on products and services that improve the quality of life of citizens and, at the same time, contribute to mind-set changes in the longer term. It also provides access to EU funding for beautiful, sustainable, and inclusive projects. Besides these, several other EU funding options have been available specifically for fostering NBS (e.g., Horizon 2020). Since 2013, the European Commission started stressing the importance of NBS, which actively contributes to its developments across the EU.

European Commission has identified **four goals that NBS can meet**:

- → improvement of sustainable urbanisation by the power of NBS to encourage economic growth, improve environmental standards and well-being,
- → restoring degraded ecosystems through the use of NBS to increase ecosystem resilience,
- → developing climate change adaptation and mitigation, and
- → improving risk management and resilience.

Given this EU focus on acknowledging the SDGs and actively promoting the tools to address them, NBS has been promoted and supported through several EU initiatives to address local challenges.

As WWF (2023) points out, **local levels** (i.e., cities, regions, and other stakeholders) have an important role in delivering climate and biodiversity outcomes, and NBS should be included in **local climate and sustainability plans**. Some of the **well-known forms of NBS** that can be **implemented** in **urban areas** include (Scientix, 2023):

- → **green roofs** and **green walls** helping to cool down the cities (especially in the summer),
- → **parks** combating pollution and providing leisure, recreation and health benefits to citizens,
- → **green corridors** connecting natural areas,
- → **urban food gardens,** etc.

Especially desired cities social-ecological corridors are networks of **interconnected NBS** that support ecosystem functions to provide benefits for people and nature, with **social and ecological benefits** including (WWF, 2022):

- → natural habitat for biodiversity and natural species migration,
- → open green spaces for recreation,
- → carbon sequestration to achieve climate mitigation goals,
- → water regulation, provision, and purification for water security and disaster risk reduction,
- → greener and healthier transportation, including implementing bicycle lanes in these corridors and promoting more walkable cities,
- → cleaner air by using urban NBS as a natural filter,
- → reduced temperatures, including through addressing the urban heat island effect.

NBS is also increasingly seen as a good solution to **mitigate effects of extreme weather** events as it can slow and store stormwater and reduce hydro-meteorological risks (Watkin et al., 2019).

A range of **different overlapping NBS approaches exist, as NBS scientific field in literature has not yet settled.** Some of the approaches, together with their examples are outlined in Table 2. The table provides a categorisation and examples of NBS approaches addressing societal challenges in the scientific literature (Cohen – Shacham et al., 2016). The overview is provided to point out the different perspectives, together with additional examples and applications of NBS. This conceptualisation will not be used in the project deliverables.

Table 2 NBS approaches and their applications

NBS approach	Examples	Applications
Ecosystem restoration	Ecological restoration	Restoration of polluted river basin or forest area that was degraded by e.g., gold mining
	Ecological engineering	Introduction of plant species (e.g., to trap sediment for coastal protection of a sandy shore)
	Forest landscape restoration	Restoration of forests (from planting trees to allowing natural process of forest succession)
Issue-specific ecosystem-related approaches	Ecosystem-based adaptation	Renaturation of rivers/canals to attenuate folding; replanting forests with more future climate-tolerant species to adapt to climate change
	Ecosystem- based mitigation (EBS)	Afforestation, reforestation and avoiding deforestation; restoration and sustainable use of coastal and marine ecosystems allowing the blue carbon to be stocked- enabling resistance to climate change
	Climate adaptation services	EBS and the importance of services for well-being
	Ecosystem-based disaster risk reduction	Large marshlands protecting from hurricane flooding
Infrastructure-related approaches	Green infrastructure	Green and blue (aquatic systems) spaces and other physical features in terrestrial and marine areas
Ecosystem-based management approach	-	Ecosystem based fisheries management, an ecosystem based approach to marine and coastal management, and integrated water resource management

Source: Cohen-Shacham et al. (2016)

In the end, it is important to point out the **main aspects of NBS effectiveness, which** include:

- → **stakeholders' participation,**
- → **policy and management capability,**
- → **economic efficiency,**
- → **potential synergies and trade-offs,**
- → **adaptation to local conditions,**
- → **performance in the long term and adequacy of spatial scale**.

2.3. Theoretical Framework of the Eco-Citizenship

As previously pointed out, ecological problems started moving to the domain of global governance in the 1980s, and one of the main challenges (besides theoretical principles) has been finding political formulae that can contribute to addressing these challenges. Green movements have affected political and social lives since then and have been provoking a range of conflicts of interest in important areas of public policy (Smith, 1998). As **governments' policies alone are not enough to meet the sustainable development goals, citizens' cooperation is needed to reduce the environmental impact** (from recycling, riding bicycles, and reducing water to many others) (Melo-Escrihuela, 2008).

Ecological citizenship is increasingly believed to improve the chances of sustainable outcomes in democratic societies (Dobson and Valencia, 2004). It is believed to **drive the pro-environmental behaviour**, thus more successfully leading lifestyle changes e than economic or external policy tools (Jagers et al., 2014). To reach the sustainable development goals, **individuals' behaviours need to be changed, as well as their attitudes**: In the short term, to change behaviour, the fiscal dis/incentives can be good, but environmental citizenship is believed to be better at changing attitudes in the long term (Dobson, 2007). Thus, environmental citizenship aims to engage citizens in a more comprehensive and value driven rethinking of their daily habits, and not just changing their behaviour as a response to a certain motivator (Jagers et al., 2014).

Eco-citizenship is a relatively recent concept in green political theory, which, when it emerged in 1980s, was focused on political-ideological aspects of ecologism, while from the mid-1990s it focused on relationship between ecologism and democracy, justice, and citizenship (Curtin, 2002). At the beginning of forming the field, two important aspects of environmental ethics were pointed out (Smith, 1998):

- → The obligations of current population to the future generations and
- → The relationship of humans to non-human animals.

Environmental citizenship has been an important topic in "green literature" since the 1990s, **linking green politics and theories of citizenship** (Melo-Escrihuela, 2008). It brings a fundamental change to individual's relationship with the environment (Jagers et al., 2014). Three main dimensions of environmental citizenship are (Levinson et al., 2020):

- → **political,**
- → **economic, and**
- → **societal**.

So local initiatives vary significantly depending on the country's political, economic, and societal situation (Levinson et al., 2020). Jagers et al. (2014) stress that **social justice** (sense of fairness) is at the centre of ecological citizenship. They distinguish three main elements of social justice:

- → general sense of fairness,
- → awareness of ecological footprints, and
- → other motives for pro-environmental behaviour.

Three **main aspects** of "ecological citizenship" are, according to Curtin (2002):

- → Relationship between globalisation, environmental problems, and new cosmopolitanism,
- → It is part of global citizenship and starts with the notion of collective responsibility,
- → It has a clear relationship with green democratic model.

Ecological citizenship is **based on the "ecological footprint" concept, which refers to the environmental impact of individuals on ecological systems** (see Humphreys, 2009) and ecological citizens are expected to:

- → Be prepared to reduce their own ecological footprint,
- → Take actions that challenge unsustainable production and consumption patterns of others with the argument of promoting an equitable division of the ecological space.

Several other concepts with similar/overlapping meanings are used in the literature: **environmental citizenship, ecological citizenship, green citizenship, sustainability citizenship, environmentally reasonable citizenship, ecological stewardship, climate citizenship,** etc. (see Melo-Escrihuela, 2008; Humphreys, 2009; Machin & Tan, 2022). Different definitions of these concepts are available in the literature and have evolved over time.

Environmental citizenship was first coined in 1990 by Canadian Ministry of the Environment (Szerszynski, 2006, 75), when it was broadly defined as ***"personal commitment to learning more about the environment and to taking responsible environmental action".*** Further on, environmental citizenship was focused on contractual rights and entitlements within public sphere, and provided the environmental rights discourse leading to promotion of

environmental public goods (Humphreys, 2009). Even in these early definitions, ecological and environmental citizenship were overlapping and mutually reinforcing while in recent literature they are even used interchangeably.

Agyeman and Evans (2006) argued that the term "environmental citizenship" in regards to "ecological citizenship", given its focus on the environment, underplays the social and political dimensions. But, later, many of these terms began to be used interchangeably, with minor pointed differences among them. Environmental citizenship is in some cases referred to as an umbrella concept which covers all the mentioned terms and their interpretations (e.g., Levinson et al., 2020). In the recent decade, its definition has become much broader, and in many cases, these terms are used interchangeably. A joint definition of Environmental Citizenship was reached among 154 experts from 39 countries from the European Network for environment citizenship (ENEC, 2018):

"It is the responsible pro-environmental behaviour of citizens who act and participate in society as agents of change in the private and public sphere on a local, national and global scale, through individual and collective actions in the direction of solving contemporary environmental problems, preventing the creation of new environmental problems, achieving sustainability, and developing a healthy relationship with nature. It includes the practice of environmental rights and duties, as well as the identification of the underlying structural causes of environmental degradation and environmental problems and the development of the willingness and competences for critical and active engagement and civic participation to address those structural causes and to act individually and collectively within democratic means, taking into account inter- and intra-generational justice".

To reach the goals of the European Green Deal and transform the EU in a sustainable society, citizens have been proclaimed to have a key role (Machin and Tan, 2022):

- → adopting sustainable consumption habits and changing their lifestyles and behaviours,
- → actively participating in policymaking.

Four key components of green/ eco- citizenship are shown in Figure 4.

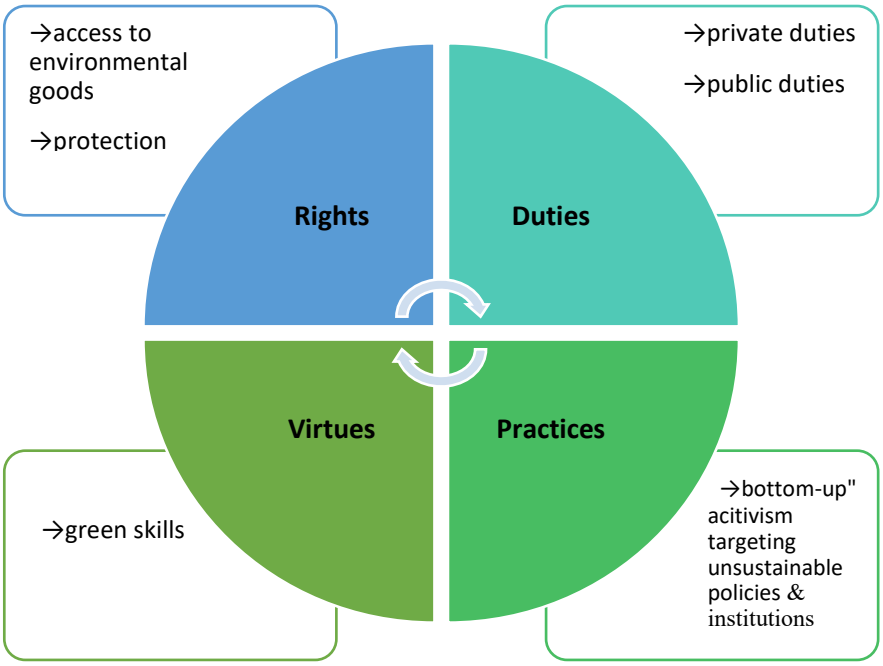

Figure 4. Four key components of green citizenship

Source: Machin & Tan, 2022

So, firstly, green citizens need to have **rights** which should guarantee them access to environmental goods and protection against environmental harms (Machin & Tan, 2022). In this regard, the European Green Deal aims to "protect, conserve, and enhance the EU's natural capital, and protect the health and well-being of citizens from environment-related risks and impacts', but does not provide a clear distinction of rights. But, as a consequence of the commitment to environmental issues addressing this triple planetary crisis (climate change, biodiversity, nature loss and pollution), combined with collaboration among a range of stakeholders, UN General Assembly recognised the universal human right to a healthy environment, which includes (UNDP, 2022):

- → clean air,
- → a safe and stable climate,
- → access to safe water and adequate sanitation,

→ healthy and sustainably produced food,

→ non-toxic environments in which to live, work, study and play, and

→ healthy biodiversity and ecosystems.

These substantive rights are complemented by procedural rights to access to information, public participation, and access to justice. This human rights-based approach, that started to evolve since the first UN global environmental conference when the "Stockholm Declaration on the Human Environment" was adopted, is seen as a critical tool to empower all people affected by environmental activities and enhance accountability for those undertaking environmental activities (UNDP, 2022). Terms that are closely related to it are "environmental justice" and "climate justice".

Green citizenship **duties** within the private sphere include changing lifestyle and consumption habits to reduce emissions and other climate change effects (Machin & Tan, 2022). They refer to eating, traveling, and communicating differently (e.g., choosing eco or local products to buy/eat; traveling by bicycle and public transport). Public duties require citizens to participate actively in policy debates and decision making, and not only passively support them (Machin & Tan, 2022).

Citizenship virtues are also often pointed out as important components of green citizenship. They refer to different "green skills" and are connected to the notion of the "good citizens" whose definition is yet to be clearly outlined. They are often acquired through education and can also help citizens take advantage of green economy job opportunities.

Practices entail a "bottom-up" approach, i.e., activism, which targets unsustainable policies and institutions. Examples of such movements were "Fridays for the future" (Machin & Tan, 2022).

Thus, environmental, / eco / green citizenship **promotes citizens as "agents of change"** (Hadjichambis, 2022), and **acknowledges their importance for reaching sustainability goals**. It is still a developing field, as its thematic evolution is ongoing.

2.4. The Theoretical Framework of the Social Economy

Although Social Economy (sometimes also referred to as "solidarity economy") has ancient roots, the field re-emerged and started to expand in the 1990s (Moulaert and Ailenei, 2005). In previous decades, only limited notions of it existed, referring to similar/partial meanings of it captured in terms such as: "non-profit activity", "community business" and "voluntary organisation", while they were not seen as part of the economy (Amin, Cameron & Hudson,

2002). The public sector alone is not enough to address the emerging social challenges, and at the same time, civil society has increased its importance in addressing them (Jimenez Escobar & Morales Gutiérrez, 2011). So, traditional sectors (public and private sector) are neither enough nor adequate in the current environment, and the "third" sector (sometimes also referred to as "fourth sector") has been developing, which integrates elements both traditional sectors. It differs from the public sector, which provides social goods through the state apparatus and from the private sector, which is focused on the profits. So, this "third sector" is growing at an intersection of traditional sectors, with the potential to help in building more resilient and inclusive societies, as shown in Figure 5.

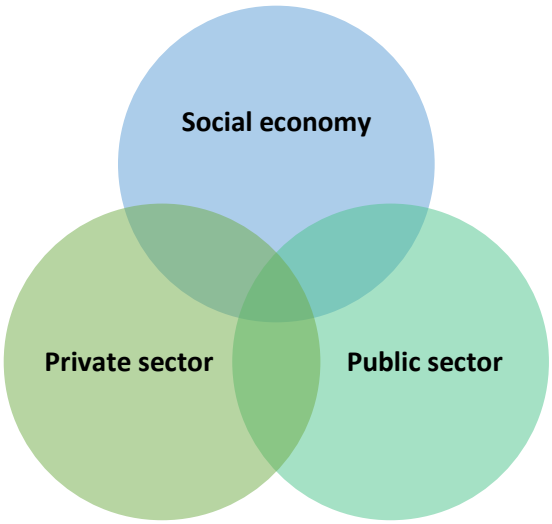

Figure 5. Sectors of the economy

Social economy includes (Escobar and Gutiérrez, 2011): **social purpose, business method, inclusive property, stakeholder governance, fair compensation, reasonable returns on investment, social and environmental responsibility, transparency, and protection of assets** (Aspen, 2009). Social economy contains various meanings depending on the context and analysed dimensions, but it generally includes all practices which do not belong to for-profit enterprises or state institutions (Moulaert and Ailenei, 2005). According to the European Commission, **social economy** includes*:*

- → a range of businesses, organisations and different legal entities,
- → with the shared objective of systematically putting people first,
- → producing a positive impact on local communities,
- → pursuing a social cause,

→ reinvesting most of the profits back into the organisation and/or social cause,
→ with participatory/democratic governance.

UNSRID (2023) provided the first multilaterally agreed definition of Social and Solidarity economy (SSE):

"It encompasses enterprises, organizations and other entities that are engaged in economic, social, and environmental activities to serve the collective and/or general interest, which are based on the principles of voluntary cooperation and mutual aid, democratic and/or participatory governance, autonomy and independence, and the primacy of people and social purpose over capital in the distribution and use of surpluses and/or profits as well as assets. SSE entities aspire to long-term viability and sustainability, and to the transition from the informal to the formal economy and operate in all sectors of the economy. They put into practice a set of values which are intrinsic to their functioning and consistent with: care for people and planet, equality and fairness, interdependence, self- governance, transparency and accountability, and the attainment of decent work and livelihoods. According to national circumstances, the SSE includes cooperatives, associations, mutual, foundations, social enterprises, self-help groups and other entities operating in accordance with the values and principles of the SSE."

The most important actors of this sector are considered to be social enterprises (hybrid of businesses and NGOs), Community foundations (hybrid between foundations and associations) and virtual solidarity networks (an alternative to traditional NGOs) (Jimenez Escobar and Morales Gutiérrez, 2011). **Social entrepreneurship** is believed to combine the **resourcefulness of traditional entrepreneurship with a mission to change society** (Seelos and Mair, 2005). Social entrepreneurship emerged in 1980s when founder of Ashoka referred to it as "entrepreneurs tackling social problems" (Ashoka, 2021), but there is still no unique definition. It clearly includes **two dimensions: entrepreneurial and social**, thus combining the passion of a social mission and image of business-like discipline (Dees, 1998). Three basic pillars of social entrepreneurship are economic, social and environmental goals of the organisation (Petričević, 2012).

European Commission (2016) defines a **social enterprise** as ***"an enterprise operating in a social economy with the primary aim of creating social performance rather than making a profit for the benefit of shareholders or owners".*** Furthermore, the European Commission (2011) identified social enterprises as:

→ operators in the social economy whose **main objective** is to have a **social impact** rather than make a profit for their owners or shareholders (social mission criterion),
→ operating through providing goods and services for the market in an entrepreneurial and innovative fashion (market orientation criterion),

- → using its profits primarily to achieve social objectives (social mission criterion),
- → managing in an open and responsible manner (governance criterion),
- → involving employees, consumers, and stakeholders affected by its commercial activities (governance criterion).

With that in mind, **social entrepreneurs** ***"are social change makers who are using entrepreneurial approaches to tackle complex social problems"*** (Catherall and Richardson, 2017). They aim to be independent of public funding, donations, or charitable actions. Although they may request initial public funding or "soft" loans from sponsors, their business model aims at long-term survival without such support. They strive to bring about change in society and support sustainable development through activities that generate enough revenue to cover all costs and to keep the enterprise financially independent. They are considered important actors in SE, but their role is evolving and needs to be fostered in order to reach their widespread effects.

Yet some critics still point out that societal needs cannot necessarily be best met by the social sector (see Ganz, Kay and Spicer, 2018), as social entrepreneurs do not have an understanding of the whole and complex system of social problems, institutions, cooperation, and relationships. There are also opinions that private firms create social impact automatically (through hiring workers, paying salaries and contributions for health or pension insurance, developing new products, and stimulating economic growth), while on the other side, some argue that social entrepreneurship makes up a very small part of the economy and affects a small number of people, which reduces the final impact and makes social initiatives short-lived and unsuccessful.

Social enterprises are considered to be an important driver of achieving the SDGs through their social and environmental impact. Their beneficiaries are often certain target groups within society (e.g., children, women, individuals with different disabilities, unemployed, homeless, etc.), society in general, animals, plants, etc. (European Social Enterprise Monitor, 2022). So, social economy strives to reach certain social and environmental goals, while seeking to create sustainable and inclusive local economies.

2.5. Nature Based Solutions and Eco-Citizenship in Higher Education

Many stakeholders have a lack of knowledge of NBS, and eco/environmental citizenship is not widely known or accepted. In the modern world, education is considered a human right and quality education is listed as one of the SDGs. Higher education is seen as vehicle to create human capital which can provide sustainable economic development. Universities are important institutional players as they have potential to have a strong economic and social

impact within their local communities, but many of them have yet not adapted to the new socio-economic challenges. Young Europeans (46%) see climate change as one of the most important challenges of the world (EEB, 2021). So, **HEIs have the responsibility of preparing their students for future challenges, which include environmental and other social challenges.**

Education has an important role in increasing the sustainability literacy of population, especially higher education, which is expected to create and foster new and innovative approaches. To foster sustainable livelihoods, **curricula need to be transformed and include sustainability knowledge, skills, perspectives, values, and issues, while going beyond" teaching about global challenges" and providing knowledge to adress the local challenges** (McKeown et al., 2002). The discussion of sustainability in Higher Education Institutions (HEI) started in the late 1970s, with an emphasis on environmental education (Faghihi et al., 2015). The main critiques of UN/ UNESCO Environmental education program (1975-1995) can be summarised as follows (Sauva and Berryman, 2007):

- → education was used to support certain political and economic agenda,
- → environment was reduced to problems of resources and
- → development was mainly associated with sustained economic growth.

Environmental education is often focused on the natural sciences, and if introduced across diverse disciplines, it often focuses on knowledge without the link to real lives (Pineda-Martos et al., 2022). This kind of environmental education is essential to provide the basic knowledge on related topics among different disciplines, but it is not enough to empower the action deriving from the new knowledge. **To foster the action, students need links to real life** - connecting it to their own experiences through engaging in local challenges, shaping their values with this in regard and providing them with competences to successfully engage in such endeavours. (Pineda-Martos et al., 2022). Environmental citizenship can be fostered through encouraging some non-formal learning, such as volunteering. Students can be encouraged to act within their local communities, as local initiatives are especially important for driving environmental improvements and social justice.

Fostering NBS and Eco-citizenship in higher education is essential to:

- → inform and empower students to **create and deliver NBS**,
- → educate them to **show pro-environmental behaviour** and
- → inform them to further (potentially) **shape their careers around these concepts**.

The role of education and education institutions in reaching a successful, just and inclusive green transition is highlighted in: (1) "European Green Deal"; (2) "EU Biodiversity Strategy for 2030", and (3) United Nations Educational, Scientific and Cultural Organization strategy

"Education for Sustainable Development for 2030" and the related United Nations "Economic Commission for Europe". Also, strategic framework for European cooperation in education

and training towards the European Education Area and beyond (2021-2030) stresses education and training for the green transition as a key priority area. All the mentioned publications include valuable information that can be helpful in the mapping exercises.

Education for Environmental Citizenship is defined as: ***"the type of education that cultivates a coherent and adequate body of knowledge as well as the necessary skills, values, attitudes and competences that an Environmental Citizen should be equipped with in order to be able to act and participate in society as an agent of change in the private and public sphere on a local, national and global scale, through individual and collective actions in the direction of solving contemporary environmental problems, preventing the creation of new environmental problems, achieving sustainability as well as developing a healthy relationship with nature."*** *(ENEC, 2018)*

*The **main outputs of environmental citizenship education** should be (ENEC, 2018):*

- ***Solving current environmental problems,***
- ***Preventing new environmental problems,***
- ***Achieving sustainability,***
- ***Developing healthy relationships with nature,***
- ***Practising environmental rights and duties,***
- ***Identifying structural causes of environmental problems,***
- ***Achieving critical and active engagement and civic participation,***
- ***Promoting Inter- and intra-generational justice.***

Pedagogical approaches used in environmental citizenship education should include: place based learning, problem-based learning, civic ecology education, pedagogy for eco-justice, action competence learning, community service learning, participatory action research, socio-scientific inquiry based learning (Hadjichambis and Paraskeva-Hadjichambi, 2020)

Some examples of the **concerns addressed in the field of education for environmental citizenship** regarding societal activities as observed by the SDGs include (Levinson et al., 2020):

- Issues of **transportation** as one of the most important factors of everyday lives: how to achieve sustainable transportation (walking, cycling, public transport), which lowers financial costs to all social groups (increases economic and social equality) and at the same time achieves a cleaner environment
- Forms and approaches to **tourism** (both important for tourists and locals)**:** How can we transform mass tourism into sustainable tourism? How can we achieve ecotourism with minimal physical, social, behavioural, and physiological effects while building environmental and cultural awareness and respect while delivering

experiences which raise sensitivity to the host country's political, environmental, and social surroundings, with low impact facilities? Also considering sustainable tourism, alternative tourism, nature-based tourism, geotourism, slow travel/tourism etc.

→ **Cultural heritage** (tangible and intangible) as an important element of sustainable development: How to strengthen awareness of the cultural context and form respect towards cultural differences?

Besides traditional lectures, class discussions, case studies, and hands-on projects (from interviewing and shadowing social entrepreneurs to writing a business plan and providing expertise and volunteer time to existing organisations focused on social change) are highly welcome in teaching for NBS. Also, design thinking approach can be useful to facilitate student learning and help them create more creative solutions with a human-cantered approach (Kickul et al., 2018). Besides understanding social needs and innovation with potential to address them, students need to be able to recognise opportunities and equipped with the knowledge on sustainable business models, measuring outcomes and scalability potentials of their endeavours (Brock and Steiner, 2009)

NBS provides an educational framework, which (Pineda-Martos et al., 2022):

- enables the transition to critical system thinking,
- raises awareness of both global and local environmental, social, and economic issues, and
- fosters environmental citizenship among students.

Students' awareness of the opportunities, benefits, and limitations of NBS is needed to facilitate the transition to a more sustainable world.

Also, **"learning about" needs to be transformed into "learning for"** which drives action and provides more significant impacts. Thus, hands-on approaches are needed. Some of the good practices of such approaches in teaching sustainability, ecological citizenship and particularly NBS can be found in SE and non-SE faculties/courses, especially in the USA. Besides engaging students in **research, design thinking and fieldwork**, many other innovative approaches can be outlined, such as:

→ **Service - learning as an experiential learning** which provides the opportunity to engage and learn within local communities through participating in sustainability projects within social economy,

→ **Living laboratories** which engages students, faculty and researchers to contribute and advance their knowledge on sustainability and conservation through projects and experiments (e.g., UC Berkely, 2023: Focusing on renewable energy, project finance and other important fields through engagement in the system design and ongoing discovery process during its operations),

- → **Sustainability interactive workshops/ seminars** including multiple stakeholders: students, scholars, policymakers, practitioners (e.g., Georgetown University, 2023: "Just Sustainability Transition Seminars" which include discussions of multiple stakeholders on environmental and societal challenges and ways to pursue just and sustainable pathways),
- → **Project-based learning:** Participating in projects to create a sustainable design on faculty campus (or outside of it), and reduce the environmental impact and promote sustainable practices in the fields of energy, waste reduction and green building design (e.g. Middlebury, 2023; see Faghihi et al., 2015),
- → Forming **environmental activism groups** which develop sustainability initiatives (e.g., Hopkins Group, 2023; and Columbia University, 2023)
- → Involving students into **green business incubators / social entrepreneurship incubators** focused to students who are developing businesses focused on environmental and social sustainability (Stanford University, 2023),
- → Organising **green / circularity challenges** (e.g., Pineda-Martos et al., 2022: Roma Sapienza students concentrate on how best NBS can solve issues related to the Building System Recovery challenge by experimenting green walls (GW), green roofs (GR), rain gardens, bioswales, treatment wetlands; and measuring integrated benefits at multiple scales, especially with respect to water cycle, water-energy nexus, and sustainable heritage restoration).

These innovative approaches highly include interdisciplinary approach, which is not so often provided in formal education systems, and is essential in sustainability education, especially for teaching NBS as future experts need to be able to respond to very complex challenges. Also they highly encourage collaborative learning to involve students in learning from each other and share knowledge among their group. Also, they are mostly focused on local problems to foster the action that follows from the knowledge.

As NBS is a relatively new professional field, students are often not well informed on the potential careers and job profiles available. So, additional NBS educational resources (teaching materials), which stress the career opportunities in this field, can be very useful to guide their professional development towards NBS (Scientix, 2023):

- → **career sheets** (providing information on job profiles around this topic),
- → **podcasts and interviews** with experts and professionals from different backgrounds that are engaged in NBS careers,
- → **game** "Green Jobs Create Economic Opportunities" where students discuss how they can transform their cities through certain future jobs (choosing certain role) which include NBS,
- → **Learning scenarios** where students analyse risks and propose NBS based on the data resulting from certain scientific research using real-world problem-solving skills.

Thus, successful higher education in this field has the potential to alleviate many contemporary environmental, social, and economic issues. So, HEIs need to adapt their approach and integrate various hands-on approaches and pedagogies.

3. INTEGRATING NATURE-BASED SOLUTIONS IN HIGHER EDUCATION INSTITUTIONS

Nature-based solutions (NBS) are increasingly recognised as effective approaches to addressing various environmental and societal challenges. Higher education institutions (HEIs) have an important role to play ting the adoption of NBS and integrating them into their curriculums. HEIs have an inherent responsibility to make societies more sustainable and must embed sustainability into their systems while considering their impacts on society (Findler et al., 2019). The integration of sustainability is more mature in the corporate sector, but the topic has received less attention in HEIs (Emerald Insight, n.d.). Therefore, it is crucial to identify best practices for the integration of NBS into HEI curriculums, particularly in the context of social economy (SE).

This chapter aims to fill the gap in knowledge by analysing the current state of NBS integration in HEIs, with a particular focus on social economy courses in five countries: Croatia, Cyprus, Greece, Poland, and Portugal. In this study, a repository with detailed information about each good practice identified in HEIs was created, and it can be found in the annex.

In this chapter, an overview of the state of NBS in HEIs in each partner country is provided. Although the main goal of this project is to focus on the social economy field, good practices in other fields, such as sciences, engineering, economics, and business, were also collected since it was challenging to find good practices in the field of social economy. Collected practices outside of social economy show high potential to be implemented as interdisciplinary studies including social economy faculties. Moreover, not only courses but also projects and summer schools that partially or fully integrate topics related to NBS into their curriculums were identified.

For each country, a minimum of five good practices have been identified, which will be selected and used as case studies to contribute to the advancement of this study in following chapters. The following table summarizes all the identified best practices in HEIs in partner countries that will be discussed in this chapter.

Overall, this chapter will contribute to the ongoing discussions on the role of HEIs in promoting sustainability and the adoption of NBS and provide insights into how these institutions can best prepare students for future challenges

Table 3 - A Summary of the identified best practices in HEIs in Partner Countries

Country	Best Practices of NBS in HEIs in Partner Countries
Croatia	Social entrepreneurship and social innovation Change management Creative laboratory Cultural and natural heritage in tourism Marketing of non-profit organizations
Cyprus	Environmental Conservation and Management “Urban Entrepreneurship: Opportunities in times of uncertainty’ Sustainable campus design Environmental Sciences and Technology The Sustainable Energy Research Center (SERC) “Urban Entrepreneurship: Opportunities in times of uncertainty’ U-SOLVE AgroLIFE Innovation Toolkit for HEIght project
Greece	Green Tech Challenge MSc in Water, Biosphere and Climate Change Forest Botanic Garden European and International Environmental Governance Research project Master "landscape architecture auth" School of Professional Education (Agricultural Extension Services)
Poland	Landscape Architecture study programme Course on “Landscape Architecture” EkoMiasto Postgraduate Studies Inter- University Academy of Climate Project "The Visegrad Sustainable Living Labs Network 4 Youth of Universities" (VSLLN4YOU)

Portugal	Environmental Sustainability Nature-Based Solutions in the Urban Water Cycle Health, Sustainability and Planning Environmental Planning- Greenways,Green infrastructures and Urban Greenspaces UC.Plantas- Knowing how to Plant the Future Environmental Planning-Greenways,Green infrastructures and Urban Greenspaces UC.Plantas- Knowing how to Plant the Future Sustainable Urban Systems HortaFCUL, PermaLab, FCULresta and greenroof projects OceanSchool URBiNAT- The Healthy Home Summer School Summer School: Climate change mitigation and territorial planning in Portugal Urban agriculture - Needs ad Opportunities

3.1. Best Practices of NBS in HEIs in Croatia

General results of the study analysing the implementation of NBS in HEI in Croatia revealed unsatisfactory results as NBS are still not formally recognized as a part of most course curriculums. More precisely, in addition to social economy courses, HEIs offer courses on environmental sustainability, environmental economics or environmental protection management that fully qualify for the theoretical or practical implementation of NBS, however formal recognition of NBS as a part of course curriculums are currently still lacking.

Out of all social economy/entrepreneurship courses in Croatia, only the course "Social entrepreneurship" held at University of Zagreb, Faculty of Organization and Informatics has the status of obligatory course (at the undergraduate level in the field of business), whilst all other courses related to SE are elective, so this course was first analyzed. The course itself integrates a diverse range of teaching techniques, but to the best of our knowledge does not include NBS solutions. Following this fining, this research takes a broader view as it analyzes courses directly covering and/or related to social economy, where, from informal perspective, several cases were identified as related to NBS.

- **project-based learning through developing sustainability of local community at one of the most isolated Croatian islands (Vis), VERN University, course "Social entrepreneurship and social innovation"**

VERN University business school curriculum was the first one to adopt a social entrepreneurship course in Croatia, “Social entrepreneurship and social innovation”. As a part of this elective course, students had the opportunity to exploit service - learning as an experiential learning technique, and project-based learning. Students enrolled in this social entrepreneurship course supported high-school students and local community from one of the most isolated Croatian islands (Vis) to develop and start their own entrepreneurial projects. The aim of these projects was to improve the lives of the inhabitants of the island of Vis, as an example of isolated, distant, and rural community. Students of “Social entrepreneurship and social innovation” course, based on their theoretical and practical knowledge, "advised" project managers about the possibilities in project development and the benefits for the targeted stakeholders.

Students at the VERN University have been involved in the work and consulting of several local projects, all aiming to increase sustainability of the island, where some of them directly used nature-based solutions:

1. *New Issa* – World Center for Island Life and Culture – project aiming to incorporate historical localities found on the island in the modern culture of Vis

2. Raising a large orchard and producing syrups and jams (*Fissa*) – project that supports NBS in the local community

3. Facilities for Student Entrepreneurship (High School Vis) – project aiming to attract new students and, in this way, support the survival of the local school and save it from potential closure due to the lack of students

4. Dry Stone Walls/*Suhozid* (Association Pomalo, Komiza) – project aiming to increase sustainable development through traditional construction techniques used on the island, as another NBS option

As a preparation for these projects, students were provided with basic information on the project objectives, as well as that these were part of a comprehensive project aiming at the development of the local community. Students spent six days on the island during which, as a part of the service-learning activities, they worked together with high-school students, local entrepreneurs, residents and representatives of local authorities. In this way students shared the professional and practical knowledge they acquired in the segment of social entrepreneurship with high-school students and entrepreneurs and thus became protagonists of knowledge sharing and social entrepreneurship activities on the island of Vis. Furthermore, projects they were working on make part of the NBS initiatives (e.g. ecological restoration in the case of Suhozid, improving community resilience and ensuring human wellbeing (projects High School and Help Centre)).

- **Students independently develop NBS projects, Faculty of Economics and Business, University of Zagreb (FEB Zagreb), course "Change management"**

Second best practice example was obtained by analysing the course "Change management" at Faculty of Economics and Business, University of Zagreb. As a part of this course students are encouraged to develop and implement some socially responsible project, including social entrepreneurship activities. Specifically, students' task as a part of this course is to design a socially useful, non-profit-oriented project that must feasible, and to put it into practice. For this purpose, students are grouped into small teams (up to 8 people) responsible for developing such projects. Furthermore, course has a very interesting start - the first assignment of these teams is to plant a tree and take care of its growth. Throughout the years, many projects developed by students were directly aligned with the scope of social economy and included green practices. What is common to all these projects was that they were not profit oriented but instead all represented initiatives to act socially responsible in an innovative manner.

One of the most recent activities undertaken by students of "Change management" in academic year 2022/2023 was to educate students and the general population about the importance of natural solutions for health protection (project "Green for Green") and in this way supporting small family firms and small entrepreneurs that develop such solutions. Students recognized that there are many traditional healing practices based on medicinal substances of natural origin, so their intention was to support the use of plants as traditional remedies instead of just man-made versions of medicines. As a part of this activity, students have organized workshops on aromatherapy and healing herbs. During the workshops, besides giving presentations, educational quizzes, and education on the use of different plants, students invited producers, small entrepreneurs, and family farms, to present their products, supporting in this way the development of new markets for family farms. Students also helped small entrepreneurs to grow their businesses by preparing digital flyers, social media management, preparing marketing plans and product label designs and assisting with pricing and new price lists. Overall, students managed to increase awareness about health issues and herbal medicine, provided information on natural solutions for disease prevention among targeted population and enhanced general wellbeing.

This example of best practice is unique as it relies on students' initiatives to implement NBS as a part of their course requirements, where this example from the course "Change management" shows that students can be very successful in developing NBS to solve diverse problems. Feedback from students that have participated in this class shows that they were highly satisfied with this innovative teaching approach.

- **Multidisciplinary teams developing NBS solutions, University of Zagreb, course "Creative laboratory"**

"Creative laboratory" is the only course at the University of Zagreb, not specifically tied to any faculty, but formed intentionally to increase study multidisciplinary and practice teamwork and creativity in an interdisciplinary environment. This elective course was first held in 2014, and it is taught by teachers from different faculties (Faculty of Economics and Business, Faculty of Electrical Engineering and Computing, Faculty of Chemical Engineering and Technology, School of Design, Academy of Fine Arts, Academy of Music). The "Creative laboratory" is an advanced educational practice that enables students to experience teamwork on projects with interdisciplinary foundations through the connection of science and art. The key goal of this modern course is to broaden students' horizons, stimulate creativity and improve communication skills through functioning in a diverse and complex environment. Couse includes both lectures and mentored work (project work). As a part of this course, within their interdisciplinary groups, students are required to develop an innovative project proposal and present it to their colleagues at the end of semester.

Since 2014, multidisciplinary student teams have developed many innovative and creative projects aligned with the idea of social economy and green practices. For example, one of the latest project proposals was "Zagreb – city of smart lightning". The intention of this project proposal was the redesign of the lightning system in Zagreb, to be aligned with natural patterns and to decrease light pollution and potential substantial harmful impact on animals, which fits with the general objective of nature change and adaptation. This team of students had realized that light pollution is a side effect of industrial civilization and that the greatest source of light pollution is outdoor lightning, including streetlamps, parking lot/shopping mall lights, exterior lights found on most homes/businesses, neon signs and illuminated signboards. Students developed innovative ideas on ways to decrease pollution through "smart lightning" which would enable the reduction of energy costs but also create more favourable living conditions for animals, as both plants and animals have developed definitive rhythms based on the changing day and night patterns.

This example of best practice is exploiting student creativity and again shows that students' joint participation in critical analysis and creative synthesis with students from other faculties can be a legitimate source of NBS that can be applied with respect to different reference points. This particular case of best practice shows that multidisciplinary student groups can lead do especially creative solutions, including NBS.

- **Traditional agricultural methods for sustainable tourism, University of Zadar, master course "Cultural and natural heritage in tourism"**

University of Zadar is provider of a master course "Cultural and natural heritage in tourism" that strongly supports student participation in activities that promote sustainable tourism. Although this course is moderately related to social economy, it does promote green practices

and natural solutions that can be tied to NBS. For example, as a part of the course students had a field trip to a family farm in Zadar region to have first-hand experience about the production and preparation of traditional food and drinks in this region. The program started with a tractor ride to the vineyards and olive grove, where students had the opportunity to show their competitive spirit in grape harvesting, the fastest cart ride, tug of war game and carrying eggs in a spoon. Students and professors then demonstrated their agricultural skills in planting seedlings of one of the "three Graces of Dalmatia" - figs, fruit tree typical for this region. At the same time, the points from each discipline were added up to declare the winning team at the end of the event. Final part of the activity were interactive workshops led by farmers, professors, and tourism stakeholders. In this way, through game and project-based learning, students learned about plant growing and traditional farming methods, i.e., students were empowered to deal with local sustainability challenges. The field trip was just one of the practical activities that students experienced. The University of Zadar is participating in an INTERREG project aiming to develop solutions for the management of micro-tourism destinations to encourage local communities to deal with the impact of the tourism industry, but at the same time preserve natural and cultural heritage and lifestyle. Other activities supporting green, slow and sustainable tourism were also organized in cooperation with project partners.

- **Supporting the development of civil society organizations that support NBS, Faculty of Economics and Business, University of Zagreb, course "Marketing of non-profit organisations"**

Last best practice analysed comes from a course in the broader field of social economy, "Marketing of non-profit organizations" held at Faculty of Economics and Business, University of Zagreb. Students in this class were involved in sustainable development of local communities by supporting the development of civil society organizations. This course used service-learning pedagogy that integrates community service with academic study (Odraz, 2020). Although it is a relatively well-known pedagogic methodology, its application in HEI is still not widespread and deserves to be mentioned in the context of implementing NBS in academia. By actively participating in solving specific social problems and involvement in civic associations or other organizations, students encounter real situations and obstacles that encourage them to think about creative and innovative solutions, thus contributing to their personal development. In the case of "Marketing of non-profit organizations" students worked with civil society organizations, participated in educational workshops, trainings, and received mentorship from representatives of 20 civil society organizations. The aim of this teaching approach was to improve management in civil society organizations, increase social responsibility and contribute to community development, which is also a broader objective of NBS.

Some of the civil society organizations supported by the project work on the implementation of NBS, as for example association "Green click" (in Croatian *Zeleni klik*). This civil society organization advocated ecologically, economically, and socially sustainable development by supporting and encouraging citizens and communities to self-organize in order to initiate change. The association was founded with the purpose of developing communal gardens on neglected city land in the Zagreb urban area, according to permaculture principles. It also educated citizens of Zagreb about the need and benefits of composting, in order to solve the problem of accumulating organic waste in gardens.

In addition to improving their skills, students in this way developed the habit of volunteering and civic engagement. However, the greatest benefit was students' feeling that they are doing something useful for the community and that their knowledge and skills can be used for the benefit of the community. This example of best practice shows that NBS can be implemented through student involvement in real-life situations, as this fosters them to take future actions in the same manner.

Table 4 - Selected examples of NBS in SE related HEIs in Croatia

Course	Provider	Year of study and status	Focus of best practice	Part of a project activity
Social entrepreneurship and social innovation	VERN University	3rd/elective	Project based learning, supporting use of NBS among stakeholders	Yes
Change management	FEB Zagreb	4th/5th/elective	Involving students into development of NBS	No
Creative laboratory	University of Zagreb	elective	Involving multidisciplinary student teams into development of NBS	No
Sustainable tourism (Cultural and natural heritage in tourism)	University of Zadar	Compulsory, 1st	Local sustainability	Yes

Marketing of non-profit organizations	FEB Zagreb	elective	Service-learning; contribution to community development and well-being	No

3.2. Best Practices of NBS in HEIs in Cyprus

The social economy sector in Cyprus is a rapidly growing area of interest for researchers, practitioners, and policymakers. However, there is a need to enhance the quality of research in this area and ensure that it is evidence-based and contributes to the development of policies and practices that support the sector. Results reveal that Nature-based Solutions (NBS) are formally recognized as a part of some course curriculums; however, most are STEM courses. Out of all courses related to social entrepreneurship and economy, only a few elective courses offer content related to NBS implementation. The mandatory social economy courses do not currently include NBS solutions, indicating the need for further integration of NBS into the HEI curriculums in Cyprus. In Cyprus it is possible to find several existing research centers related to NBS and the Social Economy sector.

Some of the best practices in Cyprus are:

- **The Open University of Cyprus (OUC), master's degree "Environmental Conservation and Management"**

The program adopts a multidisciplinary approach to environmental protection and aims to educate and train future environmental leaders. The program equips students with the knowledge and skills necessary to address complex environmental issues and effectively manage natural resources. Graduates of the program will be well-prepared for careers in a variety of fields related to environmental conservation and management. The program also emphasizes sustainability and natural-based solutions to promote sustainable development practices.

- **University of Cyprus in Nicosia, project "Sustainable campus design"**

The University of Cyprus in Nicosia has implemented a sustainable campus design that focuses on reducing the environmental impact of its buildings and providing a healthy and productive environment for its students and faculty members. The project aims to reduce the campus's overall environmental impact by using natural materials, incorporating green infrastructure, and conserving resources such as water. The project also aims to promote sustainable practices among students, faculty, and staff members by showcasing the benefits of sustainable design

and encouraging behavior change. The project could have a positive impact on academic performance, mental health, and wellbeing by improving air quality, reducing noise pollution, and providing access to green spaces.

- **Cyprus University of Technology in Limassol, bachelor's degree "Environmental Sciences and Technology"**

The program aims to provide students with a strong foundation in the scientific principles that underpin environmental science, including ecology, biodiversity, and sustainability. The program also focuses on developing students' understanding of the legal and policy frameworks that govern environmental protection and management. Students are equipped with the skills and knowledge they need to develop and implement environmental education programs for different audiences. The program also provides students with hands-on experience through fieldwork, laboratory experiments, and research projects. Graduates of the program are prepared for careers in the environmental sector and are equipped with the knowledge and skills to pursue further studies in environmental science or related fields.

- **Sustainable Energy Research Center (SERC), University of Nicosia, "Photovoltaic Expert Certification Program"**

The program aims to promote the adoption and use of renewable energy technologies, particularly photovoltaic systems, in Northern Cyprus and beyond. The program provides comprehensive training to professionals on the principles of solar energy and photovoltaic systems, enabling them to design, install and maintain these systems effectively. SERC also conducts research on renewable energy technologies and provides recommendations to policymakers and government agencies on renewable energy and energy efficiency policies and strategies. The program supports the transition to a more sustainable energy future by reducing reliance on fossil fuels and promoting the use of clean energy technologies.

- **Centre for Entrepreneurship, University of Cyprus and Urban Gorillas, course "Urban Entrepreneurship: Opportunities in Times of Uncertainty"**

The Urban Entrepreneurship course offered by the Centre for Entrepreneurship of the University of Cyprus and Urban Gorillas with the support of PwC Cyprus was a summer semester workshop aimed at addressing the challenges of urban lifestyles and changes brought about by the Covid-19 pandemic through the development of creative solutions. The course was designed to be a blended learning experience, combining online lectures, workshops, roundtable discussions, urban walks, and project development. The course covered various topics such as sustainable cities, entrepreneurship, innovation, and urbanism and adopted diverse teaching techniques, engaging mentors and lecturers from the business, academia, and arts world.

By the end of the course, participants were expected to have acquired an understanding of entrepreneurship theoretically and practically, learned how to identify and evaluate new business ideas, and gained awareness of the opportunities for entrepreneurship in sustainable cities. Participants were also taught how to develop design thinking processes and acquire creative visualisation tools to develop their business proposals. The course aims to develop creative solutions to address social, urban, strategic, and organisational problems by developing prototypes that could lead to business proposals.

The course on Urban Entrepreneurship is relevant to Social Economy Studies as it offers insights into how social economy organisations and enterprises can address social and environmental challenges in urban communities, and how NBS can be part of the solution. Social economy enterprises often focus on improving people's lives in urban areas, making urban entrepreneurship an important area of study for social economy scholars and practitioners.

- **AgroLIFE Project**

AgroLIFE is a project in Cyprus that aims to conserve High Nature Value Farmlands (HNVF) through the implementation of conservation and demonstration actions. The project focuses on two historical HNVFs in Cyprus, namely the traditional vineyard agroecosystem in the rural area of Kapilio and the carob agrosilvopastoral system at the Anogyra village. The project studies Mediterranean HNVFs, with a particular focus on vineyards and carob groves.

The overall goal of the project is to promote and enable the long-term conservation of HNVFs in Cyprus. The project has several specific objectives, including the conservation of biodiversity in vineyards and carob groves, support and promotion of sustainable agricultural practices, identification of strengths and weaknesses of current agricultural management practices, identification of strengths and weaknesses of biodiversity indicators, building a knowledge base for vineyard and carob grove HNVF in Cyprus, and encouraging stakeholder involvement and increasing public awareness regarding HNVF issues through active participatory learning.

This project has a log that includes actions related to a socio-economic study. Specifically, action D.2 in this log is "Socio-economic study," and several entries describe progress and updates on this study, including the completion of interviews with local farmers and the formulation of questionnaires for the study.

The project also includes a socio-economic study to explore community-based organisations' social and economic impact. By examining the impact of these organisations, the project contributes to the broader field of social economy studies. It helps to advance our understanding of how communities can create more equitable and sustainable economic systems.

- **University of Cyprus and The Cyprus Institute, project "U-SOLVE Urban sustainable development SOLutions Valuing Entrepreneurship"**

The U-SOLVE project is a European Union-funded initiative that aims to identify solutions for urban sustainable development through the implementation of entrepreneurial ideas that tackle contemporary environmental and social issues. The project is being implemented in six partner countries of the Mediterranean, including Cyprus (University of Cyprus and The Cyprus Institute) and focuses on creating an attractive environment to adopt urban development methods that address sustainable developmental challenges, reinforce business ecosystems, and contribute to the creation of new jobs in emerging social and environmental markets.

In Cyprus, the project is being implemented in Nicosia's urban web, which faces contemporary challenges like those of modern cities globally. The project aims to showcase creative suggestions and solutions as entrepreneurial activities to support a cultural and behavioural shift towards sustainability. The project also seeks to fund ideas with strong creative attributes and provide state-of-the-art training on sustainability and entrepreneurship to the top ten highest ranking proposals. The top five proposals will receive funding to support their initial steps in becoming a business entity and implementing their product/service design pilot introduction to the market.

The project's other important deliverable is the creation of a Sustainability Hub that will host the project's main activities, aiming to create a networking environment, synergies, and encouraging the initiation of actions relevant to urban sustainable development. The project aims to connect those responsible for administering/managing sustainability issues with those offering solutions and ideas.

This project is related to social economy studies because it is focused on promoting social and economic development through entrepreneurship. Social economy studies are concerned with understanding how economic activity can be used to promote social goals, such as reducing poverty, increasing equality, and promoting environmental sustainability. This project aims to achieve these goals by supporting entrepreneurs who are working to create sustainable and socially responsible businesses. By providing funding, training, and mentorship, this project aims to help these entrepreneurs to develop the skills and resources they need to succeed, while also creating positive social and economic impacts in their communities. In this way, this project is a clear example of how social and economic goals can be integrated to create sustainable and inclusive economic growth.

Table 5 - Selected examples of NBS in HEI in Cyprus

Course	Provider	Year of study and status	Focus of best practice
Environmental Conservation and Management	The Open University of Cyprus	Master's	Implementation of several pilot actions, including the creation of green roofs and walls, the installation of rainwater harvesting systems, and the development of urban green spaces.
Sustainable campus design	The University of Cyprus	Teaching and Research Staff	Turning the campus more sustainable
Environmental Sciences and Technology	The Cyprus University of Technology	Bachelor	Knowledge and skills needed to promote natural-based solutions in their communities
The Sustainable Energy Research Center (SERC)	The Sustainable Energy Research Center	Teaching and Research Staff	The Photovoltaic Expert Certification Program
'Urban Entrepreneurship : Opportunities in times of uncertainty'	C4E: Centre for Entrepreneurship	Bachelor, Master's	Urban Entrepreneurship
U-SOLVE	University of Cyprus Cyprus	Bachelor	Support to young entrepreneurs in urban areas with focus on the environment and sustainable development

AgroLIFE	Terra Cypria	Teaching and Research Staff	HNVFs sustain traditional methods of low-input farming supporting biodiversity and ecosystem services agrosilvopastoral system at the Anogyra village.

3.3. Best Practices of NBS in HEIs in Greece

The implementation of Nature-Based Solutions (NBS) in higher education curricula in Greece is lacking, particularly in the social sciences and humanities. NBS are present in some agricultural, environmental, and engineering programs, but their inclusion in other disciplines depends on individual instructors' research interests and course goals. Mapping of good practices related to NBS in Greek universities shows that only a few institutions include NBS in their academic programs and courses. HEIs tend to follow a more traditional approach in their core curriculum, with most of the identified innovative practices that apply NBS coming from STEM and natural science departments.

Few initiatives are exclusively organised by departments from the area of Social Economy, although some initiatives, such as the 'GreenTech Challenge', provide opportunities to promote an interdisciplinary approach and emphasise the role of the social economy in addressing social problems from a socio-economic perspective in the context of sustainable development. The identified practices use various action learning methods and experiential pedagogies, such as field trips, living laboratory experiments, and problem-based learning.

While all identified practices are promising in terms of leveraging the potential of NBS and fostering a green mindset among young learners, only one of the three identified practices is officially established as part of the master's program, namely the Summer School in the island of Nisyros as part of the 'Interdisciplinary Programme of Postgraduate Studies (I.P.P.S.) "Water, Biosphere and Climate Change".'

Separate projects and initiatives at Greek universities focusing on NBS are mostly research projects for PhD students, post-doctorates, and other research staff. These projects do not aim at undergraduate/master students but receive funding from the EU and/or national funds.

- **Entrepreneurship and competition “GreentTech Challenge”**

This initiative is not a course in a SE-related faculty as a technical university organised it; nevertheless, it is related to the field of entrepreneurship, and in the competition, many dimensions of SE area are mainstreamed, such as the sustainable tourism or the smart/

sustainable cities which apart from the economic aspect they should focus on they should examine in parallel the social and environmental aspects of any new experiment for the transition to a greener future. This is closely linked to Nature-Based Solutions (NBS), which aim to address social and environmental challenges by incorporating nature-inspired practices.

- **"Nisyros Geopark Summer School", National and Kapodistrian University of Athens (NKUA), International University of Greece (IHU), UNESCO**

The summer school is part of an interdisciplinary MSc program offered by the Department of Geology and Geoenvironment of the National and Kapodistrian University of Athens (NKUA), the Department of Forestry and Natural Environment of the International University of Greece (IHU), and the UNESCO Chair on the Conservation and Ecotourism of Riparian and Deltaic Ecosystem (Con-E-Ect). The Master's is called "Water, Biosphere and Climate Change", and it aims to provide students with practical experience and knowledge on the interaction between humans, living organisms, abiotic factors, and water from an ecological, technical, political-economic, and biological point of view under conditions of ever-increasing climate change. The summer school takes place every year during the first ten days of June in Nisyros. According to feedback from participating professors and students, the summer school has been a great success. Students have been able to engage with the natural environment and local community through field trips and laboratory exercises. This has helped them to better understand the natural environment, morphology, and geology of the island's small villages. The summer school is a great example of how HEIs can provide students with practical experience and knowledge on NBS. By engaging with the natural environment and local community through field trips and laboratory exercises, students can learn about NBS in practice and see how they can be used to address real-world challenges.

- **Practical training in nature-based solutions, Faculty of Forestry and Natural Environment, Botanic Garden**

The Botanic Garden of the Faculty of Forestry and Natural Environment is a place where students can receive practical training in nature-based solutions (NBS). It is open to students of all levels, including primary and secondary schools, Higher Technological Education Institutions, Vocational Training Institutes, and Vocational Training Centres. The garden offers visitors the opportunity to learn about the natural environment hands-on and to see NBS in practice.

- **School of Law, Aristotle University of Thessaloniki, course "European and International Environmental Governance"**

School of Law, Aristotle University of Thessaloniki. Undergraduate course offered to 3rd year students on Environmental Governance. This course offers to Law students (but also to students from other departments of the Aristotle University of Thessaloniki, who wish to undertake this subject, as it is a free-offered course to all departments) a comprehensive

approach to international and EU environmental law, policy and practices. In this framework, NBS issues are taught during the course, especially regarding climate change and biodiversity governance.

- **Department of Environment at the University of the Aegean, Research project "Center for Sustainable Circular Bioeconomy and Energy"**

NBS issues may also be found in separate projects and initiatives at Greek universities. These projects are mostly research projects, which do not aim at undergraduate/master students but PhD students, post-doctorate and other research staff (usually early-stage researchers).

These projects/initiatives are funded by the EU and/or national funds. A recent example is the Center for Sustainable Circular Bioeconomy and Energy of the Department of Environment at the University of the Aegean on the island of Lesvos. It is a research project of which fifteen (15) teaching staff members from three (3) university departments as well as five (5) special technical laboratory staff are part. It focuses on sustainable water management, sustainable waste management and biodiversity management.

- **Aristotle University of Thessaloniki, master's program "Landscape Architecture'"**

Master "Landscape Architecture'" in the Aristotle University of Thessaloniki. This Master program includes some aspects of NBS, especially regarding adaptation to climate change and urban regeneration with the help of the NBS. It is a joint master programme between the School of Agriculture and the School of Architecture.

- **Perrotis College, School of Professional Education, course "Agricultural Extension Services"**

Perrotis College, private HEI in natural sciences and agriculture, is part of the American Farm of Thessaloniki. Perrotis College offers several undergraduate and master programmes, including NBS issues. An example is the School of Professional Education, which offers courses on sustainable water management and biodiversity management. In this framework, the school offers an introduction to NBS issues as related to those subjects.

Table 6 - Selected examples of NBS in HEI in Greece

Course	Provider	Year of study and status	Focus of best practice	Part of a project activity
Green Tech Challenge	National Technical University of Athens	All education levels	Competition	No

Nisyros Geopark Summer School	Department of Geology and Geoenvironment of the National and Kapodistrian University of Athens (NKUA), by the Department of Forestry and Natural Environment of the International University of Greece (IHU) and by the UNESCO Chair on the Conservation and Ecotourism of Riparian and DeltaicEcosystem (Con-E-Ect).	Graduates (master's Level)	Summer School	No
Forest Botanic Garden	Aristotle University of Thessaloniki, Faculty of Forestry and Environmental Science	All education levels	Forest Botanic Garden	No
European and International Environmental Governance	Aristotle University of Thessaloniki	1st, 2nd, and 3rd	Biodiversity conservation, circular economy, climate change adaptation	No
Research project	Center for Sustainable Circular Bioeconomy and Energy of the Department of Environment at the University of the Aegean on the island of Lesvos	All education levels unless bachelor	Sustainable and Circular Bioeconomy in the insular region of North and South Aegean	Yes
Master "landscape architecture auth"	Aristotle University of Thessaloniki	4th and 5th	Landscape architecture	No
School of Professional Education (Agricultural Extension Services)	Perrotis College (Private Institution)	Professional education	Training programs, counselling and field research through Corporate Social Responsibility programs	Yes

3.4. Best Practices of NBS in HEIs in Poland

Polish universities are becoming greener and more sustainable through different strategies and actions. To show the scale and diversity of these activities, particularly in the NBS area, this chapter is divided into three parts. First, the situation regarding educational curricula and the presence of this content in it is presented (and those practices are included in the repository), then examples of NBS-related initiatives (outside of degree programs) are discussed, and finally general university policies and "green" directions are mentioned.

. **NBS in university curricula in Poland**

NBS issues are present in study programmes, but mainly in natural sciences and engineering, and there are very few examples from social sciences, and hardly any involve the social economy. This is also partly because only a few universities educate in social economy-related fields of study. Usually, issues related to NBS appear on individual courses included in the study program. There are also interesting examples of interdisciplinary studies combining natural and social sciences.

Here are some examples from natural sciences and engineering:

- **the Cracow University of Technology, program "Landscape Architecture study programme"**

The study programme is accredited by the International Federation of Landscape Architects - Europe (IFLA). The curriculum for this degree programme focuses on landscape design at different scales: from detail, garden, square or public park to planning scale. Skills in the use of new technologies, participatory skills and an awareness of current design directions such as sustainability, Nature-Based Solutions, the use of ecosystem services, universal design are also important.

- **Wrocław University of Environmental and Life Sciences, Course "Sustainable cities" in the Bioeconomy study programme**

The course covers topics such as: Introduction to the concept of sustainable development - identification of interconnections. Sustainable development in development policies around the world. The concept of planetary limits. Urban closed-loop economy. Overview of sustainable actions in urban management. Nature-Based Solutions in urban management. Urban adaptation to climate change. Certification of sustainable urban actions.

- **University of Warsaw, Course on "Landscape Architecture'" in the Spatial economy study program**

Part of the content has also been devoted to issues related to the adaptation of cities to climate change with the help of the NBS.

And here are the examples from social sciences and interdisciplinary studies:

- **University of Łódź, bachelor programme "EkoMiasto"**

Interdepartmental full-time first-cycle studies implemented at the Faculty of Biology and Environmental Protection in cooperation with the Faculty of Economics and Sociology of the University of Łódź. It represents a combination of managerial, economic, urban and environmental knowledge. The studies in this field of study combine issues in urban ecology and conservation as well as economics, the functioning of urban communities and land use.

NBS issues are present not only in the learning objectives but also in the study program's overall design and the study plan's content.

- **University of Science and Technology, Warsaw School of Economics and the University of Wrocław, Postgraduate Programme "The Inter-University Climate Academy" (Polish: Międzyuczelniana Akademia Klimatu, MAK)**

The studies were created by cooperating with three universities (technical, economic and humanities): AGH University of Science and Technology in Kraków, the Warsaw School of Economics and the University of Wrocław - with significant support from the banking and business sectors. It is a unique initiative in Poland aimed at educating professionals wishing to increase their knowledge of climate change and, above all, gain practical skills with this important civilisation challenge. NBS issues are also present in the study programme; ex. course: Ecological engineering and Nature-Based Solutions.

- **NBS projects and initiatives at Polish universities**

Issues related to NBS appear more and more often as separate projects and initiatives outside of study programs. Sometimes these are larger projects (including research projects) financed by EU or other foreign funds, and sometimes smaller initiatives involving the creation of certain solutions/installations based on nature on the university campuses. Some examples (they are not included in the repository, but they help understand the current situation of NBS in HEIs in Poland):

- **Adam Mickiewicz University, together with the City of Poznań, participated in the CONNECTING Nature (COproductioN with NaturE for City Transitioning, INnovation and Governance) project under the Horizon 2020 Framework Programme**

Smart and sustainable cities: implementing innovative solutions based on nature. As part of the CONNECTING Nature project, the city has introduced environmentally based solutions that contribute to improving the functioning of urban ecosystems and the natural processes within them.

- **University of Information Technology and Management, project "Visegrad Sustainable Living Labs Network 4 Youth of Universities (VSLLN4YOU)"**

The University of Information Technology and Management in Rzeszow, together with partners – universities from Hungary, Slovakia and the Czech Republic decided to create a network of university living laboratories working for the green transformation of the university. Under The Visegrad Sustainable Living Labs Network 4 Youth of Universities (VSLLN4YOU) project they enable the co-creation and testing of innovative and sustainable solutions, engage students with real-world experience, working on sustainable projects and green solutions, and prepare them to be change agents in their personal and professional lives.

- **Center for Climate Action and Social Transformations (Centrum 4CAST)**

Center for Climate Action and Social Transformations (Centrum 4CAST) at the SWPS University aims to create an interdisciplinary academic and social environment and develop innovative and effective solutions for society in response to the challenges arising from global climate change. The 4CAST Center is an interdisciplinary research and implementation center whose activities include interdisciplinary research, development and application research in the field of social sciences and humanities in the area of innovative and effective solutions for society in response to the challenges arising from global climate change.

- **Wrocław University of Environmental and Life Sciences, project "Grow Green"**

Wrocław University of Environmental and Life Sciences cooperates with the city of Wrocław, Wrocław Agglomeration Development Agency S.A. and numerous partners from abroad implement the Grow Green project (co-financed by Horizon 2020, Demonstrating innovative nature-based solutions in cities). The aim of the project is to adapt the city to climate change, among others, by creating a catalogue of demonstrative solutions providing shelter from the heat, local temperature reduction, improving air quality and enabling the use of rainwater. These examples of solutions are pocket parks, green walls and streets.

- **University of Lodz Library, "Beeblioteka"**

Beekeeping on the roof of the University of Lodz Library. Five bee colonies have taken up residence on the roof of the UŁ Library. The apiary, created in cooperation with the Association of Beekeepers of the Lodz Land, consists of five hives. They are home to 300 000 insects, which support the urban ecosystem by pollinating plants in the area.

- **AGH University of Science and Technology in Kraków, "JeżOsiedle",**

Hedgehogs house system that replicates the layout of buildings at the AGH University of Science and Technology, where hedgehogs can overwinter. The installation was created using natural materials, such as leaves collected from the campus.

- **University of Life Sciences in Poznań, Flower meadows,**

These are the university's efforts to green the city and restore the biodiversity of urban plant habitats and respond to the need to prepare and implement a comprehensive education and awareness project.

- **Botanical Garden of the University of Wrocław with anti-smog zone**

The Botanical Garden has plants that help clean the air, eg. nephrolepis, which is one of the ferns, spathiflora, herbaceous plant, or sansevieria, herb plant.

- **Eco-posts measuring air quality on the campus of the Cracow University of Technology**

These devices use the colour of the emitted light to inform about the state of air quality. They measure the concentration of PM_{10}, $PM_{2.5}$ and $PM_{1.0}$ suspended in the air - rarely verified, the smallest dust particles that pose the greatest threat to health. Placing eco-posts at the Cracow University of Technology is intended to facilitate access to currentair quality information ando increase social awareness in this aspect.

- **Photovoltaic bench**

Students from the Nova Energia Science Club, operating at the AGH University of Science and Technology in Krakow designed and built a photovoltaic bench. On the roof and on the side wall of the bench, there are 2 photovoltaic panels, each with a power of 150 Wp. On the roof of the bench is an LED lamp, and at the end of the seat there is an inductive charger, which allows for contactless charging of the phone.

Greener and more sustainable Polish universities

Several universities in Poland have adopted the goal of making universities more "green". Some universities have prepared appropriate strategies and are taking a number of actions in this direction (including those related to NBS). The importance of the green university concept (or sustainable university) is also demonstrated by the fact that it has become the subject of an international ranking, which attracts more and more institutions every year to compete for the title of most eco-efficient university. Useful in assessing the progress of environmental modernisation in the academic world is the UI GreenMetrics, a global ranking of green

universities that has been running since 2010. It ranks those universities that apply, based on several criteria: quality of environment and infrastructure, energy consumption and carbon footprint, waste production, water quality, organisation of transport and educational activities. This ranking currently includes 11 Polish universities.

Such strategies have been developed by (among others): University of Information Technology and Management in Rzeszow, Cracow University of Economics, Adam Mickiewicz University in Poznań, University of Gdansk.

An interesting new initiative in Poland is Green Universities Forum. In October 2022, the authorities of the Maria Curie-Skłodowska University (Lublin), the University of Warmia and Mazury (Olsztyn) and the University of Gdansk signed an agreement on the establishment of the Green Universities Forum. The three universities want to undertake joint initiatives for sustainable development. The rectors of these universities have agreed that the universities they manage will implement their projects in such a way as to minimize the negative impact of their activities on the environment. The Green University Forum is also expected to carefully manage resources and motivate the academic community to implement innovative projects.

Table 7 - Selected examples of NBS in HEI in Poland

Course	Provider	Year of study and status	Focus of best practice	Part of a project activity
Landscape Architecture study programme	Cracow University of Technology	The entire cycle of studies, first degree and second degree	active use of ecosystems, sustainable design, strengthening and utilizing green and blue infrastructure, or applying the 3R principle	No
Course on "Landscape Architecture'	University of Warsaw	4th, compulsory classes within the specialization	adaptation of cities to climate change with the help of the NBS.	No
EkoMiasto	University of Łódź	1st, 2nd, and 3rd	combination of managerial, economic, urban and environmental knowledge	No
The Inter-University Climate Academy	AGH University of Science and Technology in Kraków,	Postgraduate Programme	educating professionals increase their knowledge	No

	the Warsaw School of Economics and the University of Wrocław		of climate change and gain practical skills	
VSLLN4YOU project	University of Information Technology and Management in Rzeszow	Teaching and Research Staff	living laboratories working for the green transformation of the university	Yes

3.5. Best Practices of NBS in HEIs in Portugal

The study conducted on the implementation of Nature-Based Solutions (NBS) in Higher Education Institutions (HEIs) in Portugal revealed unsatisfactory results. While NBS can be found in the curriculum of STEAM courses, the same cannot be said for the field of social economy. Most course curriculums, including those in the area of social economy, do not formally recognize NBS as part of their content. However, there are a few economics and business courses that partially integrate NBS concepts into innovative projects, and some summer schools offer modules related to this topic. Unfortunately, there is still a lack of options in the curriculum specifically tailored to the social economy field.

Interestingly, faculties offering courses in science, technology, and engineering were found to have a greater abundance of units that partially or fully address the topic of NBS. On the other hand, some curricula in the fields of public administration and social sciences were discovered to include this topic, although to a lesser extent. This highlights the need for further integration of NBS principles and practices into the curriculum of social economy

courses, fostering a more comprehensive understanding of sustainable solutions across various academic disciplines.

- **University of Aveiro, course "Environmental Sustainability"**

The University of Aveiro in Portugal offers a course on Environmental Sustainability as part of its bachelor's degree in public administration. This course is closely linked to the principles of Nature-Based Solutions (NBS) as it addresses environmental challenges within the context of sustainable development and the United Nations Agenda 2030. It explores topics such as organizational management, territorial planning, and environmental sustainability challenges. Students develop their understanding of and ability to debate environmental issues by learning about the interactions between environmental factors and concerns relating to the economy, society, culture, and human health. The course uses team projects and problem-based learning

to create a dynamic learning environment that includes both theoretical and applied knowledge.

- **Instituto Superior Técnico, course "Nature-Based Solutions in the Urban Water Cycle"**

The Instituto Superior Técnico at the University of Lisbon offers a master's course on Nature-Based Solutions in the Urban Water Cycle. The course explores the challenges of managing water in an urban setting and introduces nature-based solutions for effective water cycle management. Students will learn about the characteristics of these solutions and how they relate to green infrastructure in urban areas. The course also emphasizes the development of soft skills such as information and media literacy, creative and critical thinking, and interpersonal and intrapersonal skills.

- **Catholic School of Biotechnology in Porto, course "Health, Sustainability and Planning"**

The Catholic School of Biotechnology in Porto offers a bachelor's course on Resources and Sustainability as part of its Bioengineering degree program. The course covers environmental issues such as global warming and climate change, and the impact of industrial activity on the environment. Students will learn about the principles of industrial ecology and nature-based solutions, circular design, and biorefineries in a circular economy approach. The course also covers environmental assessment tools and resource management. The course aims to give students the knowledge and skills to address environmental problems by managing natural resources and industrial processes with a focus on nature-based solutions.

- **NOVA School of Social Sciences and Humanities, course "Environmental Planning-Greenways,Green infrastructures and Urban Greenspaces"**

The NOVA School of Social Sciences and Humanities offers a master's course on Environmental Planning-Greenways, Green infrastructures and Urban Greenspaces. This course covers the study of urban planning and landscape ecology with a focus on environmental and urban planning. Students will learn about green infrastructures, greenways, and urban greenspaces as sustainable urban structures. The course aims to give students the skills and strategies they need to coordinate their actions with those of the urban ecology, environment, and landscape. The ultimate objective is to enable students to analyze and understand the dynamics, structure, and operation of the urban environment with a focus on nature-based solutions.

- **University of Coimbra, UC.Plantas- Knowing how to Plant the Future**

The University of Coimbra runs an initiative called UC.Plantas, organized by the Coimbra University Botanical Garden, which is closely aligned with the principles of Nature-Based Solutions. The initiative gives out 300 native plants to first-year students to increase their awareness of the value of protecting the region's native flora and to advance biodiversity and

sustainable development. Students can participate in reforestation projects and attend workshops and lectures on related subjects.

- **NOVA School of Science and Technology, course "Sustainable Urban Systems"**

The NOVA School of Science and Technology offers a bachelor's course on Sustainable Urban Systems with a focus on nature-based solutions. The course takes a systems approach to urban systems and covers topics such as the impact of cities on sustainability and climate change, urban ecology, green infrastructure and solutions based on nature, and circular technological solutions and smart cities. The course also covers integrated methodologies and tools such as the Superblock's Model, Urban Metabolism, Supply Chain Analysis, and the ecological footprint of cities. The course aims to integrate knowledge applied to urban systems and their effects on global sustainability and climate change. It aims to disseminate information and skills about the complexity of urban systems, their technological and ecological components, and solutions based on ecological and circular economy models with a focus on nature-based solutions.

- **Faculty of Sciences of the University of Lisbon, projects "HortaFCUL, PermaLab, FCULresta and greenroof"**

Many HEIs, including the Faculty of Sciences of the University of Lisbon (FCUL), have taken initiatives to implement nature-based solutions (NBS) on their campuses. FCUL has implemented several successful projects that serve as examples of good practices for other institutions interested in implementing NBS solutions.

One of these initiatives is HortaFCUL and PermaLab, which aims to promote sustainable development and biodiversity on the FCUL campus. The project seeks to transform the campus into a more sustainable and resilient environment by developing ecosystems that mimic natural patterns and providing educational opportunities for the FCUL community. HortaFCUL and PermaLab emphasizes participatory and experiential learning, providing valuable educational opportunities for students.

Another successful project is FCULresta, an urban forest that serves as a practical reference for a transdisciplinary approach towards climate action and promotes the Sustainable Development Goals. The project involves the creation of a mini forest, which has yielded positive impacts and results such as a 75% survival rate of the planted species and a significant reduction in water consumption. The project has involved various stakeholders, including institutional, practical, logistical, scientific, technical, and communication stakeholders.

Finally, the Green-roof installation and monitoring initiative is an example of FCUL's commitment to sustainability. The project involves the installation of a green-roof with species adapted to the local Mediterranean climate, providing various benefits to the institution and its community, including improving biodiversity, managing stormwater,

sequestering carbon, providing thermal and sound isolation, and offering leisure areas for students and faculty. The initiative's educational approach involves routine monitoring and maintenance, providing valuable educational opportunities for volunteers, students, and researchers to learn about green roof operations and sustainability in Mediterranean regions.

- **NOVA University (School of Economics and Business ,Nova School of Law, NOVA School of Sciences and Tecnology, NOVA School of Social and Human Sciences and NOVA Information Management School) and University of Algarve (Faculty of Economics), degree "OceanSchool"**

While the NBS approach is not explicitly mentioned in the curriculum of this degree, it is still a commendable practice as it involves economic and business schools in addressing environmental problems that can be effectively solved with NBS. The "Bachelor's of the Ocean" degree, a pioneering interdisciplinary course, focuses on the economic and business aspects of the ocean while emphasizing the link with nature-based solutions (NBS). The course, a collaboration between Universidade Nova de Lisboa and Universidade do Algarve, aims to provide students with a multidisciplinary understanding of ocean-related topics.

The degree engages seven different faculties from two Portuguese universities, creating a fertile environment for exploring opportunities and solutions in the ocean sector. Sustainability serves as the foundation, with five key pillars intersecting: Law, Economy and Management, Biology, Engineering and Technology, History, Geopolitics and Culture, and Information and Data Systems.

By integrating these areas, the course promotes a holistic approach to the ocean, enabling students to identify and create opportunities, overcome challenges, and develop entrepreneurial solutions. It aligns with the global challenge of implementing the 2030 Agenda, specifically addressing UN Sustainable Development Goals (SDGs) 4 (Quality Education) and 14 (Life Below Water).

The "Bachelor's of the Ocean" degree emphasizes the importance of nature-based solutions, recognizing their role in addressing the ocean's challenges. Through a transversal vision, students gain the knowledge and skills necessary to work in the private or public sector, supporting companies in finding new business opportunities and helping institutions design sustainable public policies.

- **Project "URBiNAT- The Healthy Home Summer School"**

URBiNAT is a collaborative project aimed at regenerating and integrating underserved city districts across 7 European cities. The project focuses on co-creating new social and nature-based relations with citizens, using a holistic approach that considers the full physical, mental, and social well-being of the community. URBiNAT's main objective is to create a Healthy Corridor as an innovative and flexible nature-based solution, integrating many micro nature-based solutions emerging from community-driven design processes. The project involves a

worldwide consortium of academic and business partners, who are developing participatory processes, an NBS catalogue, and a Healthy Corridor, while monitoring impacts and disseminating and marketing results. The Healthy Home Summer School is an interdisciplinary program that aims to explore human and nature-based solutions for inclusive and innovative urban regeneration. It will be held at the University of Coimbra in Portugal from July 6 to 12, 2023. The program will focus on developing a healthy corridor in Coimbra, connecting Relvinha, Ingote, and Bolão social housing with Choupal natural park. The summer school is open to students (graduate, master, and doctoral), municipal and governmental technicians, citizens, and members of associations. The program is organized by the Department of Architecture at the University of Coimbra and the Centre for Social Studies (CES), with partners including the Coimbra Municipal Council, Casa da Esquina, and Cooperativa de Construção e Habitação Económica Semearrelvinhas.

- **Faculty of Social and Human Sciences, Summer School "Climate change mitigation and territorial planning in Portugal"**

This summer school, offered by the Faculty of Social and Human Sciences, aims to equip participants with knowledge on climate change and its impacts in the Mediterranean and Portugal, with a focus on mitigation strategies such as nature-based solutions and socio-economic aspects. The course will cover topics such as land use changes, natural resource utilization, and carbon markets. Participants will learn how to develop a strategic plan to mitigate climate change in a territory of their choice by applying the knowledge gained through practical exercises. Specifically, they will learn how to relate mitigation strategies to the reality of Portuguese territory, including land use and occupation, environment and natural resources, and some socio-economic aspects. Throughout the course, there will be a strong emphasis on nature-based solutions and their potential to contribute to sustainable land-use planning.

- **School of Agriculture University of Lisbon (ISA), Summer school "Urban agriculture - needs and opportunities"**

The Summer School on Urban Agriculture is an excellent opportunity to learn about the challenges and potentials of urban agriculture and the innovative nature-based solutions and agritecture approaches that can be used to create sustainable production systems. The course aims to stimulate entrepreneurship, innovation, and research in the field and provide participants with the knowledge and skills necessary to develop intelligent, resilient, and sustainable production systems. The course on Urban Agriculture demonstrates how NbS can be used to promote sustainable territorial food systems, shortening agri-food circuits, and addressing the challenges of feeding cities in a sustainable and efficient manner. The course can also contribute to the social economy by promoting entrepreneurship and innovation in urban agriculture. Urban agriculture can be an important component of the social economy, providing sustainable food production and creating jobs and economic opportunities for local communities. The course on Urban Agriculture can provide participants with the knowledge

and skills necessary to develop sustainable and socially responsible urban agriculture projects. The course's focus on nature-based solutions and sustainable territorial food systems can promote sustainable development and support the social economy. The course demonstrates the importance of HEIs in promoting sustainable development and supporting the development of nature-based solutions and urban agriculture.

Table 8 - Selected examples of NBS in HEI in Portugal

Course	Provider	Year of study and status	Focus of best practice	Part of a project activity
Environmental Sustainability	University of Aveiro	1st/2nd/3rd	environmental challenges within the framework of sustainable development	No
Nature-Based Solutions in the Urban Water Cycle	Instituto Superior Técnico	4th/5th	nature-based solutions for effective water cycle management	No
Health, Sustainability and Planning	Catholic School of Biotechnology	1st/2nd/3rd	industrial ecology and nature-based solutions, circular design, and biorefineries in a circular economy approach	No
Environmental Planning-Greenways,Green infrastructures and Urban Greenspaces	NOVA School of Social Sciences and Humanities	4th	urban planning and landscape ecology	No
UC.Plantas- Knowing how to Plant the Future	University of Coimbra	1st	biodiversity and sustainable development	Yes
Sustainable Urban Systems	NOVA School of Science and Technology	3rd	impact of cities on sustainability and climate change, urban ecology, green infrastructure and solutions based on nature,	No

			and circular technological solutions and smart cities	
HortaFCUL, PermaLab, FCULresta and greenroof projects	FCUL	4th/5th /thesis/PhD/staff	hands-on approach, Experiential education, skill improvement, mentoring and extroversion activities connected to networking and clustering, place-based learning, problem-based learning, civic ecology education, pedagogy for eco-justice	Yes
OceanSchool	NOVA SBE and Algarve University	1st/2nd/3rd	multidisciplinary pedagogical approach, to consolidate their knowledge through practical research projects and interdisciplinary challenges.	Yes
URBiNAT- The Healthy Home Summer School	University of Coimbra	n.a	interdisciplinary and participatory model of learning	Yes
Summer School: Climate change mitigation and territorial planning in Portugal	Faculty of Social and Human Sciences from NOVA University of Lisbon	n.a	Climate change mitigation and territorial planning in Portugal	No
Urban agriculture - needs and opportunities	Higher Institute of Agronomy	n.a	theoretical lectures and practical exercises, with an emphasis on interdisciplinary and collaborative learning. The course also includes a field trip to showcase successful urban agriculture projects.	No

4. ECO-CITIZENSHIP PRACTICES IN SOCIAL ECONOMY RELATED STUDIES

This chapter further contributes to the enrichment of the study for "Integrating NBS in SE studies", by complementing the preceding chapter on best practices of nature-based solutions (NBS) in HEIs (Higher Education Institutions) in partner countries. This chapter was developed by HUB-21 under the guidance of the University of Zagreb (UNIZG), as lead partner of WP2, and with the contribution of all partners. The general aim of the report is to provide an overview of existing eco-citizenship practices in SE (Social Economy) HEIs that go beyond NBS but offer the identification of relevant learning objectives and outcomes that can feed into SE HEIs educational programmes to support the development of active sustainability skills. Another goal is to provide the current state of play regarding the representation of eco-citizenship in each participating country of the project (Greece, Poland, Portugal, Croatia, Cyprus), by displaying both enabling factors and challenges that promote or impede this process to thrive at each national level.

Before moving on to the presentation of the identified best practices on eco-citizenship in SE-related studies, the report starts with an introductory chapter about the concept of eco-citizenship, its definition, as also about the different terms that have been still used to describe it. In the same chapter, we also give emphasis on the connection of eco-citizenship to the field of SE and HE. This is followed by an overview of the presence of eco-citizenship in the participating countries and a discussion of the policies (European and national) surrounding eco-citizenship. Finally, following the description of good practices, the report ends with conclusions and lessons learnt drawn from the partners' online research on the examined topics. All topics and provided information are the result of thorough online literature review that was carried out by each partner for the purposes of the specific study.

Ecological citizenship or eco-citizenship as it will be henceforth mentioned in this report, is considered pivotal for the successful uptake and social adoption of environmental sustainability policies and in extension can be vital to reach the sustainable development goals. This is based on the main characteristic of citizenship according to the liberal tradition that dictates that active citizenship is important for the preservation of social institutions and the approval of progressive policies through creating a communal sense of ownership and responsibility. This is similar to the traditions of republican, liberal, and cosmopolitan types of citizenship (Dobson, 2003). While short term incentives can be as efficient to influence short term behavioral changes (for example higher taxation for products with a larger carbon footprint), changes in attitudes that can be achieved by a higher sense of ownership, which is associated through eco-citizenship has been shown to be more effective in the long run (Dobson, 2007).

While the idea of citizenship and environmentalism is relatively young, it has been discussed through several lenses and under different aims. This has resulted to many other concepts with similar/overlapping meanings being used in the literature: environmental citizenship, ecological citizenship, green citizenship, sustainability citizenship, environmentally reasonable citizenship, ecological stewardship, climate citizenship etc. (see Melo, 2008; Humphreys, 2009; Machin & Tan, 2022). The existence of different terms with slightly different definitions can cause confusion and have an adverse effect on a productive analysis of their state of the art. Therefore, for the purposes of SEGoesGreen, the consortium has agreed to use the joint definition of 154 experts from 39 countries from the European Network for environment citizenship (ENEC, 2018) according to which: "Eco-citizenship is responsible pro-environmental behaviour of citizens who act and participate in society as agents of change in the private and public sphere on a local, national and global scale, through individual and collective actions in the direction of solving contemporary environmental problems, preventing the creation of new environmental problems, achieving sustainability and developing a healthy relationship with nature. It includes the practice of environmental rights and duties, as well as the identification of the underlying structural causes of environmental degradation and environmental problems and the development of the willingness and the competences for critical and active engagement and civic participation to 12 address those structural causes and to act individually and collectively within democratic means, taking into account inter- and intra-generational justice"

While this definition will be used to judge the appropriateness of the best practices discussed below, some of the best practices of eco-citizenship may not use this specific term (for example a best practice that refers to its activities as environmental citizenship building). Instead, the partners that collected these practices, as well as the editorial team will examine the merits of each practice based on how it fulfils the above definition of eco-citizenship, looking at specific conditions and criteria that exist within these practices. This will allow to include practices that while linked to eco-citizenship do not use the specific term.

Eco-citizenship and the SE sector share a common ethos that relates towards mutual, communal and general interests. There are many SE organisations with explicit green goals and interpret their social aims in pure environmental terms. Examples of such organisations include food cooperatives and ethical trading initiatives. The connection between such organisations and eco-citizenship is rather obvious; the common good that is propagated by both relates to environmental protection and sustainability. As the prominent social economy writer John Pearce argued: 'It should be axiomatic that an enterprise which has a social purpose will have a clear positive environmental policy, for to be environmentally irresponsible is to be socially irresponsible' (Pearce, 2003).

Besides these examples of social economy, it has been argued that even when social economy is not directly related to the environment, social economy's ethos is shared between it and the concept of eco-citizenship. This stems from the fact that even if the social economy organisation's aim is not explicitly environmental, in attempting to achieve its social aim, the organization should do so in the most environmentally sustainable fashion. The ethos of social economy organisations thus offers a context within which citizens will be orientated towards social and environmental goods.

Another common theme between eco-citizenship and social economy is their shared active interest in the democratic structure and processes. Unlike traditional corporate structures and public bureaucracies, social economy organisations display unusual patterns of labour division and authority. For example, in a co-operative, workers are also the shareholders and the democratic principle is evident: one worker, one vote. Other social economy enterprises provide democratic forms of participation like deliberation and communal decision making. These practices are in tune with the sense of belonging and collective action that are promoted by eco-citizenship.

4.1. Overview of representation of eco-citizenship in participating countries

4.1.1. Representation of eco-citizenship in Croatia

Eco-citizenship is seen as a relatively new and underutilized concept in Croatia (Gašparović, Šulc, 2022), although some postulates of it have been included in school and university courses, particularly related to geography, biology, environmental science etc. In general, the educational system in Croatia still lacks environmental literacy and a strong focus on environmental awareness (Šulc, Gašparović, 2019), especially if looking at specific SE related studies. There is no specific course on the subject of eco-citizenship and no holistic approach to it in SE related studies, nor in general HEI studies. Still, many of its aspects have been integrated in formal and non-formal education.

There are initiatives aiming to improve the overall system of eco-citizenship inclusion in HEIs in Croatia, in accordance with world trends. The educational process at HEIs tried to be modified "through the introduction of new subjects and courses based on sustainability topics, but due to the traditional division of science and focus on individual subjects, students receive only partial knowledge, which means they are unable to gain insight into the whole of the events around them" (Hadela et al., 2021).

So, in general, it can be concluded that study of eco-citizenship in SE related studies but also HEIs in general is not systematically implemented and is fragmented through more general courses related to sustainable development or environment concerns. It is mostly on the

individual teachers who incorporate these concepts and implement practices of eco-citizenship with students in their environment or participate in various projects oriented towards development of eco-citizenship.

Opportunities

Eco-citizenship is a concept mentioned as part of graduate/undergraduate studies or specific courses concerned with sustainable development, or environmental protection. For instance, at Faculty of Economics and Business, University of Zagreb, there is a graduate specialist program „Economics of energy and environment“, where through several elective and obligatory courses students learn about different environmental management aspects from economic point of view, and through which some aspects of eco-citizenship are included. Specific concepts of eco-citizenship are approached from different aspects in various courses and depending on the university or SE related study that implements it, the aspect of eco-citizenship that is in focus and the teaching methods may be different (Raditya-Ležaić et al., 2018).

Within the non-formal education, aspects of eco-citizenship are also present through many activities of government, local administrative bodies, and other organizations (e.g., non-governmental organizations) (Gašparović, Šulc, 2019). There is a growing trend in Croatia for HEIs (involving also their students) to participate in EU projects, especially those focused on sustainable development and eco-citizenship, which provide valuable hands-on experiences. This contributes to networking and sharing experiences, knowledge and skills. Research on this topic has also indicated significance of computer technologies in education, online education courses on eco-citizenship in particular and its promotion on social networks (Gašparović, Šulc, 2019)

Challenges

When considering factors that hinder eco-citizenship practice in Croatia and challenges HEIs face with regard to this, several reasons are emphasized in the existing literature:

- Education for eco-citizenship requires better implementation in both formal and informal education in Croatia as a specific program and comprehensive concept, or part of a lifelong learning process where aspects of it would not be fragmented throughout different courses related to sustainability and environment protection in general (Gašparović, Šulc, 2019).

- Most of the offered courses now are elective not obligatory, and no holistic approach to eco-citizenship is given, which raises the question of whether students can seriously approach the concept of pro environmental behavior and consider it an important part of their education (Grgurić, 2020)

- General attitude of the population towards environmental problems ; insufficient interest and awareness, and a lack of care or motivation for eco-citizenship. There is also a lack of knowledge and information on eco-citizenship (Gašparović, Šulc, 2019).

- Existing HEIs system in Croatia does not allow too many new initiatives, and changes in the system are done at a slow pace, which can result also in a lack of teachers interested in promoting eco-citizenship (Gašparović, Šulc, 2019).

- Teaching sustainability in general and eco-citizenship specifically is still thought about only by individuals (Vukobratović, Rončević, 2020).Too often professionals do not understand the background of environmental problems and sustainability, so sustainability in Croatia is mainly considered from the perspective of nature conservation and cultural sustainability (linguistic, traditional, etc.) and less from the perspective of economic and existential sustainability. At the same time, there is a lack of systematic teacher training and professional community support when it comes to education in the field (Purković et al. (2022). So, there is the question of HEIs professionals' knowledge of the field and their education for teaching about eco-citizenship

4.1.2. Representation of eco-citizenship in Cyprus

Cyprus is a small island country located in the Eastern Mediterranean, facing several environmental challenges such as water scarcity, desertification, and climate change.

Eco-citizenship is the concept of taking personal responsibility for protecting the environment and promoting sustainable practices. In Cyprus, eco-citizenship has become an important concept, and several initiatives and programs have been launched to promote environmental protection and sustainability.

Social economy-related studies in Cyprus aim to integrate eco-citizenship into their curriculum to promote sustainable behaviour and engage individuals and communities in sustainability initiatives. These programs recognize the importance of addressing environmental issues and promoting sustainable development to ensure a better future for all.

In addition to the academic programs offered by universities in Cyprus, there are also a variety of non-profit organizations, community groups, and government initiatives that promote eco-citizenship and sustainability. These organizations often offer educational programs and opportunities for individuals to get involved in sustainability initiatives in their communities.

Opportunities

The Cyprus University of Technology (CUT) has developed a number of initiatives aimed at promoting sustainability and eco-citizenship practices. These include the creation of a sustainability committee, the development of a sustainable campus policy, the integration of sustainability into the curriculum, and the implementation of a range of green initiatives such as energy efficiency improvements, waste reduction, and water conservation.

The University of Nicosia has developed a number of sustainability initiatives, including the creation of a sustainability committee, the development of a sustainability policy, and the integration of sustainability into the curriculum. The university has also implemented a number of green initiatives, including energy-efficient lighting and cooling systems, solar water heating, and rainwater harvesting.

The Frederick University of Cyprus has developed a number of initiatives aimed at promoting sustainability and eco-citizenship practices, including the creation of a sustainability committee, implementation of a range of green initiatives such as energy efficiency improvements, waste reduction, water conservation, and the integration of sustainability into the curriculum.

The European University of Cyprus has developed a sustainability committee and a sustainability policy that includes a range of initiatives aimed at promoting eco-citizenship practices. These include the integration of sustainability into the curriculum, the implementation of a range of green initiatives such as energy efficiency improvements and waste reduction, and the development of partnerships with local communities and businesses to promote sustainable practices.

Challenges

Limited resources: According to a report by the European Commission, many higher education institutes in Cyprus face financial constraints that limit their ability to invest in sustainability initiatives.

Lack of awareness: The same survey of university students in Cyprus found that only around 50% of respondents believed that their institutions were taking sufficient measures to promote sustainability. In addition, a study by researchers at the University of Cyprus found that many faculty members were not familiar with sustainability concepts and did not incorporate them into their teaching.

Resistance to change: The same study by the University of Cyprus researchers found that some faculty members were resistant to incorporating sustainability concepts into their teaching, citing concerns about the relevance of these concepts to their subject areas.

Insufficient policy framework: The European Commission report notes that Cyprus has made some progress in developing policies to support sustainable higher education, but that further action is needed to fully embed eco-citizenship practices in institutions.

Limited collaboration: A survey of university students in Cyprus found that many students were not aware of opportunities to get involved in sustainability initiatives on their campuses, indicating that there may be a need for greater collaboration and outreach efforts.

Limited student engagement: While there are certainly students in Cyprus who are interested in sustainability issues and eager to get involved in eco-citizenship practices, there may be a broader lack of engagement and participation among the student body.

4.1.3. Representation of eco-citizenship in Greece

Even though eco-citizenship has not been promoted systematically and centrally in Greece, the population seems to already perform well in metrics related to it. Specifically, a study published in 2023 (Amprazis, 2023), concluded that Greeks actually have a low Ecological Footprint compared to the average European. This study also showed that there are no significant variations based on the age or educational level of the participants with the only factor that seemed to be important being gender (women had a significantly lower footprint). This is important because it dictates that policies which could improve this number and instill eco-citizenship to Greeks do not have to be designed with factors like age specifically in mind and can address the public as a whole. Of course, a low ecological footprint does not guarantee high levels of eco-citizenship. Greeks still have very unsustainable practices when it comes to nutrition and transportation. Therefore, efforts should be undertaken to cultivate an eco-citizenship identity that would directly address these two sectors.

There has been a clear and demonstrated connection between Citizenship Education and citizenship. After all, many researchers have discussed the concept of citizenship and how its development often is a long-term process that requires training and education. The same relationship exists between eco-citizenship and Education for Environmental Citizenship. Therefore, we will look into the opportunities as well as challenges that Education for Environmental Citizenship offers in Greece in order to ascertain conclusions about the spread of eco-citizenship in the country.

Opportunities

The rapidly and radically changing socio-economic and technological environment, mainly connected to the ICT sector as well as to the economic crisis, offer some new opportunities for the development of Education for Environmental Citizenship in Greece. These include the involvement of research Institutes and Academia for providing the proper knowledge and the operation of the Open University, an institution designed to tackle modern and transversal challenges such as sustainability issues. Finally, while the economic crisis negatively impacted the country, it is also creating new mentalities and behaviours among the citizens leading thus to many opportunities for new ways of thinking and educating about climate.

Challenges

A major obstacle are the many recent changes and reforms in both the Greek education system and the curricula in primary and secondary education, making the launch of Education for Environmental Citizenship difficult. This is exacerbated by the fact that trainers and teachers are not adequately and competently instructed in it.

4.1.4. Representation of eco-citizenship in Poland

Eco-citizenship in Poland is a new concept of environmental awareness, understood as the citizen's belonging to the environment and the associated rights and obligations. It also means a widely understood concept of environmental protection through the implementation of more environmentally friendly, innovative solutions in various aspects of civic life, including education.

It is also a concept of participatory and political citizenship for the common protection of the general interest. However, it should be clearly emphasised that eco-citizenship is important for Polish society. It is seen as relevant in terms of shared responsibility for environmental protection and the need for educational measures to promote these ideas.

Given the above information, it is not possible to identify examples of NBS linked to Social Economy degree courses. It is also impossible to explain how these courses relate to NBS.

The challenge, therefore, is to introduce eco-civic practices into the Polish higher education system at universities teaching Social Economy issues.

Opportunities

In Poland, only one higher education institution, the Pedagogical University of Kraków, offers full-time studies in social economy at Bachelor's and Master's level. Several universities have introduced elements related to social economy into their curricula. This has taken place in the

form of postgraduate studies or elements incorporated into undergraduate curricula (single courses) within fields such as social entrepreneurship and CSR, local development, social policy and social assistance (Ciepielewska-Kowalik A., 2020).

Challenges

Some elements of the eco-citizenship concept have been incorporated into university courses related to, for example, environmental science or environmental protection in the broadest sense. However, the Polish educational system lacks a course called "Eco-citizenship" in both higher education and social economy courses. Nevertheless, many aspects related to eco-citizenship - e.g. sustainable development, environmental protection - have been introduced as thematic elements in the course modules of Bachelor's degree courses (first level of higher education), Master's degree courses (second level of higher education), or post-graduate courses at universities teaching subjects not related to Social Economy.

In general, there are no laws in Poland that explicitly refer to the concept of eco-citizenship. We can only speak of concepts such as sustainable development, environmental protection or ecology.

4.1.5. Representation of eco-citizenship in Portugal

The term "eco-citizenship" is not commonly used in Portugal. Still, some initiatives, such as "The ECOCITIZENSHIP Project," aim to increase children and young people's participation and intervention in local decisions on environmental, biodiversity, and sustainable development issues. However, terms such as environmental education and education for sustainable development are more commonly used, particularly as part of the citizenship module in primary and secondary education.

Opportunities

The Sustainable Campus Network - Portugal (RCS-PT) was established in 2018 to encourage collaboration among individuals from national higher education institutions to implement sustainable development principles and practices. On October 31, 2019, 12 of 14 universities, 12 of 15 polytechnic institutes, and 4 of 5 non-integrated higher education schools signed a Letter of Intent committing to sustainability principles and practices at the first Sustainable Campus Conference. New institutions are welcome to join this initiative. It outlines several action principles, such as promoting sustainability ethics, providing sustainability training, promoting transdisciplinary approaches, disseminating knowledge, supporting collaborative and interdisciplinary networks of sustainability experts, and collaborating with other sectors of society.

The #FridaysForFuture movement has resulted in an increase in initiatives to make universities more sustainable. In 2021, students from the Instituto Superior Técnico (IST) gathered signatures from over 2,200 individuals and 80 student groups demanding that Portugal's higher education institutions declare a climate emergency and achieve carbon neutrality by 2030. The following year, as part of the "Ocupa!" movement, IST students occupied their campus, demanding an end to fossil fuels by 2030 and creating a mandatory cross-disciplinary course on the Climate Crisis and Just Transition. The IST Council eventually agreed to investigate the possibility of developing the course, which will be offered in the second semester of 2022/2023 and will cover topics such as the climate crisis, just transition, transition policies, and finance. The goal is for the course to become a part of basic training for all students at IST.

Challenges

Despite growing concern for sustainability, the first diagnosis of sustainability implementation in higher education in Portugal, which examined the results of a survey of 104 out of 106 higher education institutions conducted by the Campus Sustainability Network in 2021, the integration of sustainability in education is still in the early and poorly integrated stages. However, 33% of higher education institutions (HEIs) are interested in the SDGs and have mentioned several initiatives to integrate sustainability into existing courses or create new ones. Most HEIs provide formal courses and lifelong learning dedicated to sustainability, and sustainability is integrated into courses in various ways.

Although there may be challenges in promoting sustainability in education and curricula, such as raising awareness and educating managers and teachers, the survey results show a relatively optimistic scenario for profiling HEIs in Portugal. The survey also discovered that the scientific areas in which sustainability competencies are acquired vary significantly, with "environmental sciences" being the most well-represented, followed by "environment" as a group of courses and the energy-related area. Other courses in the social sciences and exact sciences have also been identified. On the other hand, courses in economics, business, and humanities tend to place less emphasis on eco-citizenship and sustainability development in their curriculum.

Nonetheless, three courses in the field of social economy stand out, according to the survey: the Postgraduate Program in Social Economy - Cooperativism, Mutualism, and Solidarity, the master's in economics and management of the Environment, and the Doctorate in Global Studies. According to the survey, universities in Portugal are becoming more committed to sustainability, and curriculums should become more focused on eco-citizenship and sustainability issues in the coming years.

Incorporating sustainability into higher education curricula is critical, but there are obstacles. One area for improvement is incorporating sustainability themes into existing disciplines, which takes considerable effort. Another approach is creating modules within a specific discipline,

which can result in knowledge fragmentation. Developing distinct courses or degree programs necessitates coordinating resources from multiple faculties and departments. Incorporating sustainability into curricula necessitates careful planning and cross-disciplinary collaboration. Although progress has been made, there is still a long way to go to ensure that students receive a comprehensive and interdisciplinary sustainability education.

4.2. Policies fostering eco-citizenship in each country and in HEIs

4.2.1. Policies fostering eco-citizenship in Croatia

In general, Croatia does not have a special law or policies concretely related to fostering eco-citizenship. Still, commitment to a pro-environmental behaviour is evident in many previous strategic documents, policies, and activities done by the Croatian Government in the context of environment protection and general sustainable development. For instance, alongside World Conference on Environment and Development in Rio de Janeiro, in 1992, Croatian Parliament voted for the Declaration on Environmental Protection. Through this document it is stated that Croatia: "*commits to sustainable economic development based on sustainable agriculture, forestry, maritime and tourism, as well as economy and industry based on environmentally friendly technologies; energy policy focused on energy efficiency and the gradual introduction of renewable sources, and the right of the public to participate in decision-making on activities that will have a significant impact on the environment*".

Further, immediately after Agenda 2030 adoption in 2015, the Republic of Croatia started activities for its implementation in Croatia. In general, primarily because of its EU membership obligations, Croatia has made improvements in environmental policies and systems, and passed several action plans. However, there is still much to be done in terms of actual enforcement and implementation (SGI, 2019). Considering the chronological sequence of the starting ideas expressed in the educational policy documents, it can be noted that the Republic of Croatia tried to get closer to European reference frameworks primarily within the framework of bureaucratic procedures, trying to amortize lagging behind other European countries. Nevertheless, at the same time there was no systematic methodical implementation of the concept in the educational system (Vukobratović, Rončević, 2020).

The Law on Environmental Protection of the Republic of Croatia from 2007, in the chapter "Education and education for environmental protection and sustainable development" stipulates that the state ensures the implementation of education for environmental protection and sustainable development in the educational system and that, in cooperation with the ministry responsible for education, determine the guidelines of the educational program in

accordance with the Sustainable Development Strategy of the Republic of Croatia (Vukelić et al., 2022). However, concrete systematic applications are still missing.

4.2.2. Policies fostering eco-citizenship in Cyprus

Sustainable Development Action Plan for Education: The Ministry of Education, Culture, Sport, and Youth launched the Sustainable Development Action Plan for Education in 2017. The plan aims to promote sustainability practices in all levels of education, including higher education.

CYQAA Quality Assurance Standards: The CYQAA has included sustainability and social responsibility criteria in its quality assurance standards for higher education institutions. The implementation of these criteria is mandatory for all higher education institutions seeking accreditation from CYQAA.

Sustainability Committee at the University of Cyprus: The University of Cyprus has established a Sustainability Committee, which is responsible for promoting sustainability practices in the university's operations and curricula. The impact of the Sustainability Committee on the university's sustainability practices is regularly evaluated through sustainability reports and audits.

RME Cyprus Initiative: Launched by the Cyprus Network of the United Nations Global Compact (UNGC) in 2019, the initiative aims to promote sustainability and social responsibility in higher education institutions through:

- Offering training programs on sustainability and social responsibility for faculty and staff
- Promoting research projects on sustainability and social responsibility
- Organizing networking events and collaboration opportunities among higher education institutions and other stakeholders

The impact of RME Cyprus on the promotion of eco-citizenship practices in higher education institutes is still under evaluation.

Overall, the policies and initiatives aimed at promoting eco-citizenship practices in higher education institutes in Cyprus are relatively recent and ongoing, and their impact on promoting sustainable practices is still being evaluated. However, they demonstrate a growing awareness of the importance of sustainability and social responsibility in higher education and a commitment to embedding eco-citizenship practices in the education system.

4.2.3. Policies fostering eco-citizenship in Greece

Greece has not developed a special regulatory framework for eco-citizenship. However, it has adopted respective strategies and policies, in order to support the development of responsible behaviour, civil society empowerment and participative decision-making processes. Greece is committed to promote the Sustainable Development Goals and contribute to sustainable development through several policies, such as:

- The National Strategy for Promoting Sustainable Development towards 2030 (March 2019): there is a special section (Chapter 4) on promoting an equal and inclusive sustainable development, according to the Agenda 2030 and the Sustainable Development Goals. It affirms the country's priority to further develop and promote Social and Circular Economy.

- Law 4430/2016 (Social/Solidarity Economy) and Law 4513/2018 (Energy Communities): Based on these two national laws Greece undertakes coordinated efforts to include local communities and support participatory approaches especially in the energy sector. It has also committed to promote cooperative schemes of entrepreneurship (Social Cooperative Enterprises)

- The National Strategy on Circular Economy (March 2021), which commits to promote citizen engagement in all policies.

Besides, Greece as a member-state of the EU is committed to the EU Green Deal and all respective European laws and policies.

Regarding the educational system, environmental education and sustainable development education have been included mostly in the primary and secondary levels of education, but there has not been a systematic approach to connect environmental education and citizenship in the schools' curricula (A. Moschopoulou & D. Karakatsani, 2020). The Greek regulatory framework has supported the establishment of Environmental Education Centers (EECs) at schools since 1993. The EECs cooperate in joint programmes with Universities, Research Institutes and other Governmental and Non-Governmental Organizations, in order to offer educational programmes for primary and secondary schools relating to the local environment, teacher training seminars, regional, national and international networks and the production of educational material. During the last years, the EECs have implemented Life-Long Learning Programmes (LLP) and Citizenship Education (CE) (Hadjichambis, A. et al, 2019).

4.2.4. Policies fostering eco-citizenship in Poland

In Poland, there is no law or regulation dealing directly with the concept of eco-citizenship or its promotion. However, the topics of environmental protection and sustainable development are important for the Polish legal system, society and education system.

In Polish law, there are laws on environmental protection together with the relevant executive acts, which provide a framework of rules for the protection of the environment and ways of using it. Public authorities have a duty to protect the environment and to involve citizens in this process.

The legal basis for Poland's sustainable development is the provision of Article 5 of the Constitution of the Republic of Poland. Considering this statement, it seems that the adherence to the principles of sustainable development is one of the most vital national interests in Poland. Next, the Environmental Protection Law of 27.04.2001 indicates what sustainable development means in Polish legislation. Article 3, point 50 of the Act states that: "it is understood as such social and economic development in which political, economic and social activities are integrated with maintaining natural balance and permanence of basic natural processes in order to guarantee the possibility of satisfying basic needs of particular communities or citizens of both the present and future generations".

At the same time, due to its EU membership obligations, Poland has made improvements regarding its environmental policies and systems and has enacted several action plans. The most important of these is a plan adopted in 2020 called the National Environmental Policy 2030 - Strategy for Development in the Field of Environment and Water Management. It contains Poland's objectives and commitments at the international level, including at the EU level and the UN Sustainable Development Goals, especially in the context of the objectives of the EU Climate and Energy Policy 2030, the MARPOL Convention for the Prevention of Pollution from Ships, the HELCOM Helsinki Convention and the three Rio Conventions: Convention on Climate Change, Convention on Biological Diversity and Convention on Desertification. The Plan will form the basis for the investment of European funds from the 2021-2027 financial perspective particularly in the context of the EU's 2030 climate and energy policy goals and the sustainable development goals included in Agenda 2030.

In the context of education, the Polish State ensures the implementation of education on sustainable development and environmental protection in the education system. Appropriate actions related to the environmental policy should be based on the implementation of current environmental concepts (e.g. NBS into the education system). Here, there is still a lack of concrete, systematic applications and this remains to be done.

4.2.5. Policies fostering eco-citizenship in Portugal

Portugal has implemented policies encouraging eco-citizenship and sustainable practices. The National Strategy for Education for Citizenship (ENEC) was developed as part of the priorities set in the Program of the XXI Constitutional Government for the education sector.

Through education and training, **the National Program for Climate Change 2020/2030** aimed to disseminate best practices and promote low-carbon behaviours in society. T**he National Energy and Climate Plan 2030 (PNEC 2030)** replaced it, emphasising eco-citizenship through education and training in climate change mitigation, low-carbon economy, and air quality.

The Climate Framework Law of Portugal unifies the objectives, principles, and obligations for climate action, including climate education. According to the law, climate education must be integrated into formal education at all levels and promoted through museums, science centres, libraries, and other forms of communication. The National Strategy for Environmental Education (ENEA) ensures a consistent commitment to promoting sustainable behaviour models in Portugal.

The **Eco-Schools and EcoCampus programs** in Portugal promote sustainability education and environmental citizenship in schools and higher education institutions. The Eco-Schools program recognises excellence in environmental education and offers assistance and training at all levels. The EcoCampus program encourages continuous improvement in campus environmental management and promotes sustainability in higher education institutions.

Since 2005, ABAE has implemented the **ECOXXI program** in Portugal, focusing on sustainability education and environmental quality for local decision-makers and technicians. It recognises eco-municipalities with good practices in areas such as environmental education, energy, waste, and so on, using 21 local sustainability indicators. The program provides municipalities with a management tool to help them achieve sustainability.

Although these policies need to be evaluated, it is noteworthy that policies implemented in Portugal to promote eco-citizenship and sustainable practices have had numerous positive effects on the population and education system. These policies have increased public awareness of the importance of living a sustainable and healthy lifestyle, thereby aiding in mitigating, and adapting to climate change. Furthermore, programs such as Eco-Schools, EcoCampus, and ECOXXI are critical in promoting sustainability education and eco-citizenship in schools and universities. Nonetheless, despite the positive impact of Portugal's policies, more is required to address the current climate crisis. It is critical to continue and strengthen the work that Portugal has been doing in terms of implementing new policies. Furthermore, a more comprehensive curriculum is required to provide youth and future professionals with the necessary skills to combat climate change.

4.3. Good practices of eco-citizenship in HEIs

For the purposes of this report, all the consortium partners collaborated to collect best practices on eco-citizenship in SE related higher education in their corresponding countries. Following an instruction to select up to 5 practices from their country, 24 practices were selected and mapped. For Greece, this task was split between Hub-21 and UOM. Additionally, research was conducted to map eco-citizenship best practices globally, with a focus outside the EU. This was done in order to allow the consortium to draw inspiration and broaden its understanding on the role of eco-citizenship in SE.

Examining the mapped good practices, we notice some trends and patterns. Many of them, about 1/4, are University courses offered in a SE related field of study. Additionally, other four good practices were examples of Master's study programmes and the last major type of practices includes a series of workshops, seminars (webinars) and summer schools.

4.3.1. Eco-citizenship practices in HEIs in Croatia

Responsible partner that collected the practice	Faculty of Economics and Business, University of Zagreb
Country of the best practice initiative	Croatia
City of the best practice initiative	Zagreb
Topic/ Title of practice	Change management course and environmental protection projects
Level of application (Local/ regional/ national)	local
Name of institution or SE-related department that implements the practice	Faculty of Economics and Business, University of Zagreb
Level of study:	3/4/5 year of Integrated undergraduate and graduate university study programme

Type of practice	A course
Objectives of practice (a summary)	At Faculty of Economics and Business, University of Zagreb, through course Change management, an elective course offered students work on design of various projects that need to reflect on different socially responsible aspects of life, including pro environmental behaviour. Projects also need to be implemented in community and contribute to wider social environment. In academic year 2022/ 2023 some projects reflected on waste and waste management in main parks in Zagreb. More specifically students in one of the projects designed and implemented activities related to collection and proper disposal of waste at three main city parks in Zagreb. In order to encourage as many people as possible to join and thus encourage action, project administrators published information related to the project on social networks as well as produced additional promotional materials.
Results/ Impact of practice	Through this project, students were able to reduce the amount of waste in three main parks in the city of Zagreb, encourage others to join current and future waste collections (planned every two months); educate people about proper waste separation and promote a healthy lifestyle and protection of the environment.
Engaged stakeholders	Educator of the course, students involved in the course, local community
Pedagogical approach(es) that is adopted through this practice	Individual student project assignment, lectures, using real-world scenarios and problem-solving activities.
Links – online info	

Responsible partner that collected the practice	Faculty of Economics and Business, University of Zagreb

Country of the best practice initiative	Croatia
City of the best practice initiative	Rijeka
Topic/ Title of practice	WATERSPACES summer school
Level of application (Local/ regional/ national)	Regional/national
Name of institution or SE-related department that implements the practice	University of Rijeka
Level of study:	Postgraduate study program
Type of practice	A summer school
Objectives of practice (a summary)	Since the academic year 2021-2022, University of Rijeka in cooperation with Delta Lab offers postgraduate specialist study program Urban Studies. As an interdisciplinary study, the aim is to examine all aspects of city development, using architectural methods of research and inquiry, along with the consideration of the cultural, social, economic, and logistical forces that determine urban development and provide sustainable living and environmental protection. As part of the program, in order to better understand the environmental aspects and the interplay between historical, cultural and natural heritage and their preservation, together with partners from Italy and Serbia, a summer school WATERSPACES is organized. The 7-days summer school takes places on a boat. Professors and researchers coming from Italy, Serbia, Croatia and France hold the seminars, and program is implemented through six daily seminars and workshops on board, and five visits on the ground.
Results/ Impact of practice	The Summer School brings closer together, in the same ideal and practical framework, cultural heritage and environmental preservation. The focus is on the deep interaction among academics, students and local communities regarding sustainability of maritime life, and draws attention to the

	meaning of distributed responsibility. In 2022, summer school contained three main thematic directions; archaeology and heritage, social and historical context and sea and environment. More specifically focus was on cultural heritage: local knowledge and citizens' engagement; sustainability in the Adriatic Sea, and dark heritage and political identities.
Engaged stakeholders	educators, students, local community, professional associations (Delta Lab)
Pedagogical approach(es) that is adopted through this practice	Lectures, real life examples, visits to local organization and natural heritage sites, problem solving activities
Links – online info	https://ls-pmts.unibg.it/sites/cl16/files/summer_school_waterscapes_2022_description.pdf

Responsible partner that collected the practice	Faculty of Economics and Business, University of Zagreb
Country of the best practice initiative	Croatia
City of the best practice initiative	Zagreb/ on line
Topic/ Title of practice	Terragov simulation game
Level of application (Local/ regional/ national)	national
Name of institution or SE-related department that implements the practice	Faculty of Economics and Business, University of Zagreb

Level of study:	Bachelor/ Master's programme/ Integrated undergraduate and graduate university study programme
Type of practice	Two summer schools / Risk simulation game
Objectives of practice (a summary)	From 2020 to 2023. Faculty of Economics and Business, University of Zagreb has been participating as a partner in an ERASMUS plus project „Teaching Institutional Resilience and Prompt Reaction to Crisis: Good Governance Experiences in Europe (TERRAGOV)". Main goal of the project was to contribute to knowledge creation with regard to good governance, educating participants on the optimal ways to build institutional resilience through collaboration of both public and private actors in society, bringing a new approach to participation of students as future actors at the national level, European and global business ecosystem. Among many project activities, students were able to participate at two international summer schools where topics of responsible global citizenship and sustainable governance were analysed, as well as topics related to different aspects of prosocial behaviour. In addition, as one of the intellectual outputs a Terragov risk simulation game was developed, available as online learning tool on e-learning platform that students are able to assess and actively engage in.
Results/ Impact of practice	The game is designed to address enhanced resilience in times of structural crisis, challenges of global entrepreneurship and all in the framework of sustainable development. Within the simulation game, each student or group of students, find themselves in a position of a major and they have to govern their city in the following 4 years with limited budget. In governing their city, they need to allocate the budget according to the targeted satisfaction ratings, and taking into consideration areas of health, security, transport, education, employment, utilities, pollution control and aesthetics. For instance, they can allocate their budget towards constructing new park or solar plant, or giving grants for green energy adoption. All decision made have to be towards ensuring targeted happiness ratings of citizens in the city. The effects of policies and budget allocation can be observed constantly. During the simulation a disaster occurs (big earthquake) affecting the happiness ratings and seeking students to adjust their budget decisions and allocation towards ensuring

	the minimum happiness ratings. Student results are compared, and best players can be identified.
Engaged stakeholders	Educators, students
Pedagogical approach(es) that is adopted through this practice	Lectures. real life examples, problem solving activities, simulation game
Links – online info	https://terragov.ase.ro/

Responsible partner that collected the practice	Faculty of Economics and Business, University of Zagreb
Country of the best practice initiative	Croatia
City of the best practice initiative	Zagreb
Topic/ Title of practice	Smart and Slow Tourism Supporting Adriatic Heritage for Tomorrow" - TAKE IT SLOW project
Level of application (Local/ regional/ national)	regional
Name of institution or SE-related department that implements the practice	Department for tourism and communication science, University of Zadar
Level of study:	Bachelor/Master's programme
Type of practice	A series of workshops
Objectives of practice (a summary)	Department for tourism and communication science, University of Zadar, is one of the HEIs that strongly emphasizes the importance of sustainable tourism development and its impact

	on natural resources. It offers graduate study program in sustainable tourism, covering aspects such as economics and policy of environmental protection in tourism, but also offers courses at other study levels, including courses as Ecology, and Valorization and protection of natural heritage. Professor and students are also involved as partners on a project TAKE IT SLOW - Smart and Slow Tourism Supporting Adriatic Heritage for Tomorrow financed by European fond for regional development. The "TAKE IT SLOW" project was designed with the aim of managing and promoting the Adriatic as a sustainable, green and smart European tourist region through the establishment of a value chain in tourism according to the principles of smart specialization, and consideration of tangible and intangible resources, cultural and natural heritage.
Results/ Impact of practice	The project helps develop solutions for the management of micro-tourism destinations in order to encourage local communities to deal with the impact of the tourism industry, and actively engage them in preserving natural and cultural heritage and lifestyle. The University of Zadar organizes workshops in the field of smart specialization on the topic of "green, slow and sustainable tourism" and provides examples of good practice. For instance, The University of Zadar organized an educational tour “Ravni kotari: gastronomy – culture – nature”, to present the importance of preserving natural and ecological heritage of the region and visit to micro entrepreneurs that emphasize the importance of pro environmental behavior in their work. Beside these, through project different workshops are organized, such as a workshop on the topic of eco measures and eco schemes in agriculture and their importance for sustainable tourism, educational workshop dedicated to olive pruning, ecological agriculture and production, quality certificates, and eco-label.
Engaged stakeholders	Educators, students, local micro entrepreneurs, local community, professional associations, policymakers and regional authorities, municipalities
Pedagogical approach(es) that is	Lectures, workshops, on site visits

adopted through this practice	
Links – online info	https://www.italy-croatia.eu/web/take-it-slow/news

Responsible partner that collected the practice	Faculty of Economics and Business, University of Zagreb
Country of the best practice initiative	Croatia
City of the best practice initiative	Križevci
Topic/ Title of practice	SOFI – Smart Organic Food Initiative
Level of application (Local/ regional/ national)	regional
Name of institution or SE-related department that implements the practice	Križevci College of Agriculture
Level of study:	Bachelor/Master's programme
Type of practice	A series of workshops and active engagement of students in all project activities
Objectives of practice (a summary)	Križevci College of Agriculture as a public and independent higher education institution educates competent professionals in social sciences (field of economics) and biotechnical sciences (field of agriculture) by means of delivering bachelor and specialist graduate professional study programs. They also participate in various projects within local community to foster sustainable development and agriculture with strong emphasis on circular economy and preservation of natural resources. Together with partners: Association for Economy of Communion, Croatia, Center for Lifelong Learning, Travnik, Bosnia and Hercegovina, and Starkmacher from Germany they participate in SOFI – Smart

	Organic Food Initiative project. This is a project financed by European climate initiative, from Federal Ministry for Economic Affairs and Climate Action in Germany with the aim to strengthen cooperation in the EU in the further development and implementation of EU climate policy.
Results/ Impact of practice	The basic premise of the project is that farmers in the target regions of Križevci, Croatia and Travnik, Bosnia and Hercegovina, do not have the necessary knowledge and are not familiar with alternative, ecologically and economically profitable ways of producing agricultural products. The project will therefore include research on the impact of local agriculture and the potential of eco-smart agriculture to positively impact climate change and biodiversity. The project started in December 2022 and last until March 2025. At the beginning of the project, stakeholder mapping and recording of the current situation, together with the study on the presence and impact of carbon sequestration methods in food production on local farms is being done. A stakeholder conference will be organized with debates, discussions and analyses for the creation of a climate action plan for smart ecological agriculture in each of the two municipalities studied. Through various project activities (workshops at Eco festivals and visits to farmers during the green education program), the exchange of knowledge and experiences between different conventional and organic farmers will be encouraged. These activities will deal with raising awareness and will be developed in cooperation with and for municipalities, and will help to include the topic of smart organic production in local development strategies. In addition, workshops at Eco festivals, conferences and accompanying websites will be used to spread information about sustainable food production. A green education program aimed at supporting business ideas on ecological agriculture will bring visibility to the idea of green agribusiness by supporting farmers, landowners and students and making them initiators of positive climate action. Students of all KCA programs will participate in all project activities and become carriers and initiators of awareness of climate actions.

Engaged stakeholders	Educators, students, local farmers, local community, professional associations, policymakers and regional authorities, municipalities
Pedagogical approach(es) that is adopted through this practice	Lectures, workshops, problem solving activities, on site visits
Links – online info	https://www.euki.de/en/euki-projects/sofi-organic-food-initiative/

4.3.2. Eco-citizenship practices in HEIs in Cyprus

Responsible partner that collected the practice	SYNTHESIS
Country of the best practice initiative	Cyprus
City of the best practice initiative	Nicosia
Topic/ Title of practice	"End Climate Change, Start Climate of Change"
Level of application (Local/ regional/ national)	Local/Regional/National
Name of institution or SE-related department that implements the practice	University of Nicosia Research Foundation
Level of study:	All

Type of practice	EU funded European Project
Objectives of practice (a summary)	The project "End Climate Change, Start Climate of Change" is a European project, which aims at developing young EU citizens awareness and critical understanding of climate change induced migration, as one of the biggest challenges of the globalized world. • Raising awareness of young EU citizens on the nexus between the economic system we live in, our lifestyle and human-induced climate change effects in the Global South • Promoting sustainable lifestyle patterns and a shift towards a sustainable, human economy model within our planetary boundaries. • Engaging and activating young EU citizens in support of policies and development actions to tackle climate change as a driver of irregular migration and forced displacement worldwide.
Results/ Impact of practice	A vibrant Pan-European impact will be guaranteed thanks to a strong common visual identity and message and a clear EU campaign roadmap of both online and live activities, such as the Pan EU Street Action Tour traveling for 80 days through Europe and stopping in 10 EU cities; the TEDx Talks in 4 EU cities and broadcasted online, etc. Moreover, it will be a focused and strategic campaign on climate change and migration priorities bringing EU Development Policy and EU answers to global challenges closer to citizens.
Engaged stakeholders	Educators, students, local organisations
Pedagogical approach(es) that is adopted through this practice	
Links – online info	https://www.unrf.ac.cy/projects-item/climateofchange/

Responsible partner that collected the practice	SYNTHESIS
Country of the best practice initiative	Cyprus
City of the best practice initiative	Nicosia
Topic/ Title of practice	**Environmental Conservation and Management**
Level of application (Local/ regional/ national)	local
Name of institution or SE-related department that implements the practice	Open University of Cyprus
Level of study:	Master
Type of practice	course
Objectives of practice (a summary)	To provide students with advanced knowledge and understanding of the principles of environmental conservation, management, and sustainable development. To equip students with the practical skills necessary to apply these principles in real-world settings. To prepare students for careers in environmental consulting, natural resource management, environmental policy and advocacy, and sustainable development. To provide students with opportunities to develop research skills and undertake independent research projects in specific areas of environmental conservation and management.

	To promote critical thinking and problem-solving skills in the context of environmental conservation and management. To foster an understanding of the social, economic, and political dimensions of environmental issues and their impact on society.
Results/ Impact of practice	1. Graduates of the program are equipped with advanced knowledge and skills in environmental conservation and management, making them highly qualified for a range of careers in the field. 2. Graduates can contribute to the development and implementation of sustainable environmental policies and practices, which can have a positive impact on the natural environment and society as a whole. 3. The program fosters critical thinking and problem-solving skills in the context of environmental issues, preparing graduates to tackle complex environmental challenges. 4. Through independent research projects, graduates can make meaningful contributions to the field of environmental conservation and management by generating new knowledge and insights. 5. The program promotes an understanding of the social, economic, and political dimensions of environmental issues, encouraging graduates to consider the broader implications of environmental policies and practices.
Engaged stakeholders	1. Educators: The program is taught by experienced educators who are experts in the field of environmental conservation and management. 2. Students: The program is designed for students who are interested in pursuing a career in environmental conservation and management or related fields.

	3. Staff: The program is supported by administrative staff who provide administrative and logistical support to ensure the smooth running of the program. 4. Employers: Employers in the environmental sector may be interested in hiring graduates of the program who have advanced knowledge and skills in environmental conservation and management. 5. Associations: Professional associations in the environmental sector may be interested in partnering with the university to promote the program and provide networking opportunities for students and graduates. 6. Policymakers: Policymakers at the local, national, and international levels may be interested in the program as it can provide them with access to a pool of graduates who are well-equipped to contribute to the development and implementation of sustainable environmental policies and practices. 7. Municipalities and Regional Authorities: Municipalities and regional authorities may be interested in the program as it can provide them with access to a pool of graduates who are well-equipped to contribute to the development and implementation of sustainable environmental policies and practices at the local and regional levels
Pedagogical approach(es) that is adopted through this practice	• The approach is student-centered and emphasizes active learning, practical skills development, and independent research. • The program uses a combination of lectures, seminars, group projects, case studies, and independent research projects. • Lectures provide a foundation of knowledge, while seminars and group projects enable students to apply this knowledge to real-world scenarios.

	• Practical skills are developed through hands-on activities such as field trips, laboratory work, and data analysis. • Critical thinking and problem-solving skills are developed through discussions and debates on complex environmental issues. • Independent research projects require students to undertake research on specific topics related to environmental conservation and management. • This approach encourages students to take an active role in their learning and provides them with the knowledge, skills, and experience necessary to contribute to the field of environmental conservation and management.
Links – online info	https://www.ouc.ac.cy/index.php/en/studies/master/master-dpp-2

Responsible partner that collected the practice	SYNTHESIS
Country of the best practice initiative	Cyprus
City of the best practice initiative	Nicosia
Topic/ Title of practice	**MSc in Education for Sustainable Development and Social Change**
Level of application (Local/ regional/ national)	Local

Name of institution or SE-related department that implements the practice	Frederick University
Level of study:	Masters
Type of practice	Course
Objectives of practice (a summary)	1. Develop a comprehensive understanding of sustainable development as a political, ideological, and complex concept. 2. Analyse and critically evaluate global, regional, and local sustainable development issues as major challenges for humanity. 3. Explore Sustainable Development Goals (SDGs) as universal, transformational, and inclusive goals that can be achieved through social engagement and responsibility. 4. Reflect critically on their own theories, values, beliefs, learning, and practice about sustainable development issues. 5. Deliver Education for Sustainable Development (ESD) as a transformative, critical pedagogy that is responsive to the systemic, holistic, and values-oriented nature of sustainable development. 6. Embrace ESD as a lifelong learning process that draws experiences, skills, and action opportunities from non-formal and informal educational settings. 7. Develop competencies for ESD and transfer them to learners in their professional environments, operating as multiplier agents for sustainable development. 8. Apply basic principles and strategies of ESD to foster the values and skills necessary for sustainable, just, and inclusive growth and peaceful living together. 9. Analyse and critically discuss the social transformative impact of arts (visual arts, drama, literature) in the context of sustainable development.

	10. Use and develop ICT-enabled instructional materials and programs that foster sustainability, justice, and positive values, attitudes, and ethical behaviour towards sustainable human development. 11. Demonstrate leadership in implementing whole institution approaches to ESD. 12. Deconstruct and reconstruct the conventional discourse on ESD curriculum, teaching, learning, and research methodology, embracing principles of empowerment, change agency, active participation, and critical reflection.
Results/ Impact of practice	Firstly, graduates of this program can have a direct impact on the quality of education for sustainable development and social change in formal, informal, and non-formal settings. They can design and implement educational programs that promote sustainability and social justice, and transfer competencies to learners in their professional environments. Through their work, they can contribute to the development of a sustainable and just society. Secondly, graduates can also have an indirect impact on society as a whole. By promoting sustainability and social justice through education, they can raise awareness and foster a sense of responsibility among learners, who can then become agents of change themselves. This can lead to a ripple effect, where the impact of the program is felt beyond the immediate learners and extends to the wider community. Thirdly, graduates can also contribute to the development of the field of education for sustainable development and social change through research and inquiry. They can apply their knowledge and skills to conduct research that advances the understanding of sustainable development and social change and contributes to the development of evidence-based educational policies and practices.

Engaged stakeholders	1. Students: Students are the primary stakeholders in the program. Their engagement is essential to the success of the program, as they are the ones who will benefit directly from it. 2. Faculty members: Faculty members are responsible for designing and delivering the program. Their engagement is critical to ensuring that the program is of high quality and meets the needs of students and the broader community. 3. Employers: Employers may be stakeholders in the program, as they may be interested in hiring graduates of the program. Their engagement can help ensure that the program is relevant to the needs of the job market. 4. NGOs and community organizations: NGOs and community organizations may be stakeholders in the program, as they may be interested in partnering with the program to promote sustainable development and social change. 5. Government agencies: Government agencies may be stakeholders in the program, as they may be interested in promoting sustainable development and social change through education and may be able to provide support and funding for the program. 6. Alumni: Alumni of the program may be stakeholders, as they have first-hand experience of the program and may be interested in supporting its continued success.
Pedagogical approach(es) that is adopted through this practice	
Links – online info	https://www.frederick.ac.cy/en/msc-in-education-for-sustainable-development-and-social-change

Responsible partner that collected the practice	SYNTHESIS
Country of the best practice initiative	Cyprus
City of the best practice initiative	Nicosia
Topic/ Title of practice	The Green Programme
Level of application (Local/ regional/ national)	Local
Name of institution or SE-related department that implements the practice	Cyprus International Institute of Management (CIIM)
Level of study: Bachelor Master's programme PhD Postdoctoral	Master
Type of practice	Course
Objectives of practice (a summary)	1. Promoting awareness: The Green Program aims to raise awareness among students, faculty, and staff about the importance of sustainability and environmental responsibility. This includes promoting sustainable practices in their daily lives, as well as in the workplace and the community. 2. Integration of sustainability in academic programs: The Green Program aims to integrate sustainability into the curriculum of all academic programs offered at CIIM. This includes incorporating sustainability-

	related topics and case studies into courses, and offering specialized programs and courses related to sustainability and green business practices. 3. Green campus operations: The Green Program aims to reduce the environmental impact of CIIM's campus operations. This includes reducing energy and water consumption, reducing waste, promoting the use of sustainable materials, and promoting sustainable transportation options. 4. Collaboration with stakeholders: The Green Program aims to collaborate with various stakeholders, including industry partners, government agencies, and non-governmental organizations, to promote sustainability and environmental responsibility. This includes partnerships to develop research and consulting projects related to sustainability, and organizing events and workshops to promote sustainability in the wider community.
Results/ Impact of practice	The Master in Green and Digital Management has a significant impact on the professional prospects of its graduates. By providing them with a comprehensive understanding of both digitalization and green transition, the program equips them with the skills and competencies to pursue a wide range of career options in various sectors, including small and medium-sized companies, big corporations, NGOs, and the public sector. The program's focus on eco-innovation, circular economy, and sustainable business practices also prepares graduates to respond to the current challenges of environmental sustainability, making them valuable assets to any organization seeking to implement green strategies. Additionally, graduates will be equipped to bridge the gap between business and technology, driving innovative practices to address environmental and sustainability challenges.

	The program's emphasis on digital transformation and adoption also prepares graduates to pursue careers in digital management, where they can help organizations leverage technology to improve their operations and respond to changing market demands.
Engaged stakeholders	
Pedagogical approach(es) that is adopted through this practice	
Links – online info	https://www.ciim.ac.cy/msc-green-digital-management/

4.3.3. Eco-citizenship practices in HEIs in Greece

Responsible partner that collected the practice	University of Macedonia
Country of the best practice initiative	Greece
City of the best practice initiative	Amfissa
Topic/ Title of practice	Advice to farmers "ELAIONAS" Office
Level of application (Local/ regional/ national)	Local/ Regional
Name of institution or SE-related department that implements the practice	Agricultural University of Athens, Department of Regional and Economic Development
Level of study:	Undergraduate
Type of practice	Establishment of a new Office in the premises of the University in Amfissa, which will be run by students.
Objectives of practice (a summary)	Its main goal is to provide free advisory services to farmers/local community on oil

	production/cultivation/restart of their business and local economy. Big part of oil fields burnt and this student advice service will assist in re-making of the area.
Results/ Impact of practice	Students interact with local community in such projects and get more involved in the environmental problems of their city.
Engaged stakeholders	Educators, students, farmers, local community
Pedagogical approach(es) that is adopted through this practice	Real-world scenarios and problem-solving activities, workshops etc.
Links – online info	It is not yet officially launched in their website, but it will be next month (end of May 2023) https://w1.aua.gr/poa/en/home/

Responsible partner that collected the practice	University of Macedonia
Country of the best practice initiative	Greece
City of the best practice initiative	Thessaloniki
Topic/ Title of practice	Social Innovation and Networking of Social and Solidarity Economy ventures in the context of Community Economies. Creation of a Social Innovation Pilot Lab
Level of application (Local/ regional/ national)	All
Name of institution or SE-related department that implements the practice	Aristotle University of Thessaloniki, School of Urban-Regional Planning and Development Engineering
Level of study:	Undergraduate
Type of practice	Establishment of a new pilot laboratory on social economy

Objectives of practice (a summary)	To interact and network with stakeholders, to explore issues of communities economies and familiarize students and researchers with those topics.
Results/ Impact of practice	Educators, researchers and students interact with local community in projects of social economy
Engaged stakeholders	Educators, students, local community
Pedagogical approach(es) that is adopted through this practice	Research, real-world scenarios and problem-solving activities, , conferences etc.
Links – online info	https://users.auth.gr/ggritzas/el/index.htm

Responsible partner that collected the practice	HUB-21
Country of the best practice initiative	Greece
City of the best practice initiative	Thessaloniki
Topic/ Title of practice	T-A-4 Commons, alternative spaces and participatory planning
Level of application (Local/ regional/ national)	local
Name of institution or SE-related department that implements the practice	Spatial Planning for Sustainable and Resilient Development Aristotle University of Thessaloniki
Level of study:	Master's PhD
Type of practice	A course

Objectives of practice (a summary)	The course focuses on highlighting a different view on the economy, putting centre-stage the interaction between people and the environment in order to define the full range of human needs (beyond material ones), surplus management, ethical dimensions of exchange, the production and management of the commons, and investment in a future that may improve holistically the well-being of individuals and society. Such a view of the economy reframes ways of dealing with the contemporary challenges of climate change and other risks, maximising potentials for collective prevention and proposing ways of management aiming at reversing the terms of problems' production.
Results/ Impact of practice	Learning Outcomes - Understanding alternative spaces and diverse economies - Familiarising with approaches to the commons - Understanding alternative perspectives of development: post-development, degrowth, community economies General Competences • Adapt to new situations • Work in teams • Work in an interdisciplinary team • Appreciate diversity and multiculturality • Respect natural environment • Demonstrate social, professional and ethical commitment and sensitivity to gender issues • Be critical and self-critical • Advance free, creative and causative thinking
Engaged stakeholders	Students, staff, educators
Pedagogical approach(es) that is adopted through this practice	Education for sustainability Civic education Inquiry based learning

Links – online info	https://qa.auth.gr/en/class/1/600133153/M1

Responsible partner that collected the practice	HUB-21
Country of the best practice initiative	Greece
City of the best practice initiative	Athens
Topic/ Title of practice	ACG Sustainability Leaders
Level of application (Local/ regional/ national)	Local
Name of institution or SE-related department that implements the practice	American College Greece
Level of study:	Bachelor's and Master's
Type of practice	Student organisation
Objectives of practice (a summary)	The **ACG Sustainability Leaders** group is a, newly founded, team of student volunteers who participate in diverse activities and events aimed at motivating, inspiring and raising awareness towards a culture of Sustainability both on and off the ACG campus. The ideal **Sustainability Leader** candidate is not necessarily the one with the most knowledge about the sustainability. We are looking for people who are enthusiastic about learning about and promoting sustainable living. If you are reliable, good-natured and excited to be a sustainability advocate in your residence hall, we want YOU! Part-time or full-time students from **all majors are welcome** to apply.

	As a **Sustainability Leader** you will participate in activities, such as the ACG Community Service Days, awareness raising campaigns (e.g. #ACGgoesplasticfree and Reduce, Reuse, Recycle!), reforestation of Mount Hymettus, and many more.
Results/ Impact of practice	**Desired Skills** • Interest in and a passion in any of the three pillars of sustainability (environment, society, economy). • Effective communication skills (through a variety of means). • Positive and can-do attitude. • Willingness to learn and acquire new skills. • Open to share information with peers. • Ability to take initiative and to work as a team player. • Reliability • Strong time-management skills. **Benefits** • Build your CV and develop a set of valuable professional competencies and soft skills. • Help in enhancing the sustainability culture on campus. • Engage with peers, who are also interested in promoting sustainability education. • Gain knowledge and understanding of current sustainability issues. • Make new friends and be better connected to the ACG Community. • Gain the opportunity to expand your sustainability network.
Engaged stakeholders	students
Pedagogical approach(es) that is adopted through this practice	Service based learning (which is promoted mainly via the ACG Community Service Days) Project Based learning

	Problem based learning
Links – online info	https://www.acg.edu/current-students/student-services/student-life/getting-involved/student-organizations/acg-sustainability-leaders/

Responsible partner that collected the practice	HUB-21
Country of the best practice initiative	Greece
City of the best practice initiative	Online
Topic/ Title of practice	Corporate Sustainability & Responsibility School
Level of application (Local/ regional/ national)	International
Name of institution or SE-related department that implements the practice	University of Crete
Level of study:	Non-formal
Type of practice	10-day series of webinars
Objectives of practice (a summary)	The **CSR School** provides advanced training regarding the identification of sustainability-related business opportunities and the inclusion of responsibility in the core of one's business strategy, in order to achieve sustainable value and formulate a more resilient organization. The training program is envisioned as a journey that will cover all major identified areas that relate to the responsible management of sustainability. From

	September to December 2022, during which a minimum of 40 hours of sustainability-related knowledge and management experience will be shared, trainees will gain an up-to-date overview of major developments around the largest environmental, social and governance challenges affecting businesses nowadays. During the 10-part Webinar series, the participants will watch lectures by distinguished academic faculty members, discuss relevant case studies, learn about best practices that have been implemented by experienced senior professionals and exchange views and thoughts around the incorporation of relevant theory into the CSR initiatives of their own organization.
Results/ Impact of practice	
Engaged stakeholders	Ministry of Development and Investments Ministry of Finance University of Crete
Pedagogical approach(es) that is adopted through this practice	
Links – online info	https://csr-school.eu/

4.3.4. Eco-citizenship practices in HEIs in Poland

Responsible partner that collected the practice	Pedagogical University of Kraków
Country of the best practice initiative	Poland
City of the best practice initiative	Gdańsk

Topic/ Title of practice	Sustainable campus
Level of application (Local/ regional/ national)	local
Name of institution or SE-related department that implements the practice	Gdańsk Polytechnic
Level of study:	All levels
Type of practice	Practical solutions, campaigns, projects for students to increase eco-awareness and eco-engagement of students.
Objectives of practice (a summary)	The activities are carried out are aimed at protecting the climate in the field of education and research, but also to increase environmental awareness and the involvement of the academic community. Internal initiatives related to the use of natural resources are also undertaken. Gdańsk Polytechnic also develops an attitude of responsibility in students by involving them in the decision-making process.
Results/ Impact of practice	Key elements of the activities: 1. Rainwater tanks installed on campus. 2. The “By bike to the university” campaign. 3. Numerous green areas and insect houses. 4. Special dispensers from which you can fill a reusable cup or bottle with water.

	5. Possibility of submitting projects by students under the "Participatory Budget". 6. Climate plan of the Gdańsk University of Technology for 2022-2030.
Engaged stakeholders	Students, educators, employers
Pedagogical approach(es) that is adopted through this practice	Teaching by experience and students' engagement - attitudes among students are shaped through the implementation of solutions supporting e.g. water saving and air protection - which shapes students' attitudes in the field of eco-citizenship. Inviting students to submit eco-civic projects ensures the development of positive attitudes towards the environment among young people.
Links – online info	https://zie.pg.edu.pl/node/1330/dobre-praktyki/zrownowazony-kampus

Responsible partner that collected the practice	Pedagogical University of Kraków
Country of the best practice initiative	Poland
City of the best practice initiative	Wrocław
Topic/ Title of practice	« Eco projects for eco universities » - competition for the most ecological solutions for the Wrocław University of Science and Technology campus
Level of application (Local/ regional/ national)	local

Name of institution or SE-related department that implements the practice	Wrocław University of Science and Technology
Level of study:	All
Type of practice	Competition for the most ecological solutions for the Wrocław University of Science and Technology campus
Objectives of practice (a summary)	The main idea of the "Santander Eco Awards for Wrocław University of Science and Technology students and PhD students" competition was to create a project of an innovative ecological installation, supporting Wrocław University of Science and Technology 's pursuit of zero-emission, taking into account the possibility of practical application of the proposed solutions on the campus.
Results/ Impact of practice	26 individual and 16 team projects were submitted to the competition, of which 33 were finally qualified for evaluation (20 individual and 13 team projects). Students from almost all faculties of the university as well as doctoral students submitted their ideas. The projects awarded in the competition for the most ecological solutions for the Wrocław University of Science and Technology campus are: an intelligent waste container, a module for photovoltaic panels that purifies the air and a system for the effective use of rainwater. The solutions have been designed in such a way that e.g. have educational functions, and when implemented on campus, they will teach users selective waste collection and shape pro-environmental attitudes.
Engaged stakeholders	Students, educators, university authorities, Santander Bank Polska (Santander Universidades Program)
Pedagogical approach(es) that is adopted through this practice	Contest for the practical solutions for students

Links – online info	https://pwr.edu.pl/uczelnia/aktualnosci/eko-projekty-dla-eko-uczelni-12115.html

Responsible partner that collected the practice	Pedagogical University of Kraków
Country of the best practice initiative	Poland
City of the best practice initiative	Olsztyn
Topic/ Title of practice	https://ekokampus.fjk.org.pl/wp-content/uploads/eko-kampus-2021.pdf
Level of application (Local/ regional/ national)	local
Name of institution or SE-related department that implements the practice	University of Warmia and Mazury
Level of study:	all
Type of practice	a course
Objectives of practice (a summary)	In 90s as the first university in Poland University of Lodz introduced « Environment protection » As its innovative « version » the university introduced new course « Ekomiasto » starting from 2018/2019 academic year. Within the education they offer popularized knowledge as a field of study. January 2021, UAM runs the Sustainable Development Academy, where scientists record video materials about their research activities, discussing the 17 UN Sustainable Development Goals.

	Short lectures are made available to the general public via YouTube.
Results/ Impact of practice	This is a new series of interesting, passionate stories that premiered in January 2021, under the banner of the educational project implemented by the university - Kolaboratorium. In the Academy of Sustainable Development series social, natural, political and economic issues are discussed - precisely in the context of the Sustainable Development Goals. The YouTube channel has already gained almost 7,000 likes. subscribers, disseminating knowledge about ecological solutions and making the public aware of the need to increase care for the planet.
Engaged stakeholders	Students, educators, other stakeholders interested in the field subscribed to the YT channel.
Pedagogical approach(es) that is adopted through this practice	The Academy of Sustainable Development is a series of short popularizing lectures presenting research and activity in the environment and UAM scientists in the context of the 17 UN Sustainable Development Goals.
Links – online info	https://www.youtube.com/playlist?list=PLYO5ta-64HEBkEol6HASLJW7YCVygTFBo https://amu.edu.pl/wspolpraca/relacje-z-otoczeniem/akademia-zrownowazonego-rozwoju

Responsible partner that collected the practice	Pedagogical University of Kraków
Country of the best practice initiative	Poland

City of the best practice initiative	Kraków
Topic/ Title of practice	SDG Labs digital gallery
Level of application (Local/ regional/ national)	Transnational
Name of institution or SE-related department that implements the practice	Pedagogical University of Kraków, Institute of Law, Economics and Administration
Level of study:	Bachelor Master's programme
Type of practice	A series of online courses on green skills in the field of social economy
Objectives of practice (a summary)	The SDG Labs digital gallery provides an online repository with a wide range of ready-to-use and interactive co-creation activities, tools and resources, and a digital package of lecture projects that will support the development of social and green business competences.
Results/ Impact of practice	The SDG Labs digital gallery consists of the following online elements: • An online screening tool with case studies of SEEs that operate in economic sectors with environmental objectives (e.g. rural development, renewable energy, re-use and recycling, sustainable housing and agriculture) and/or incorporate green practices and environmental-friendly approaches into their activities. • A digital package of Lecture Plans providing clear and easy to follow steps in order to deliver lessons that incorporate the aspect of environmental sustainability and cultivate students' skills related to green transition in specific SE courses. • An online depository of interactive and co-creation activities supporting social and green entrepreneurial competence development that can be utilized by

	university teachers when implementing the SDG Labs programme. This depository is flexible, and universities can select the resources that suit their context and the needs of their students.
Engaged stakeholders	Students, educators from the partnering organizations: 1. Pedagogical University of Krakow, Poland 2. Stimmuli for Social Change, Greece 3. Prague University of Economics and Business, Czech Republic 4. University of Macedonia, Greece 5. The Square Dot team, Belgium 6. Association for Social Cooperatives, Poland
Pedagogical approach(es) that is adopted through this practice	Interactive series of online courses on green skills in the field of social economy
Links – online info	https://sdglabs.uom.edu.gr/sdg-labs-digital-gallery-2/ https://ipea.up.krakow.pl/sdg-labs/

Responsible partner that collected the practice	Pedagogical University of Kraków

Country of the best practice initiative	Poland
City of the best practice initiative	Warsaw
Topic/ Title of practice	4CAST CENTER - The Center for Climate Action and Social Transformation to develop innovative and effective solutions for society in response to the challenges arising from global climate change.
Level of application (Local/ regional/ national)	national
Name of institution or SE-related department that implements the practice	SWPS University
Level of study:	all
Type of practice	Other - research and new solutions development
Objectives of practice (a summary)	The aim of The Center for Climate Action and Social Transformation wants to support social commitment to the climate on the basis of integrated cooperation in the sphere of science, local governments, business and non-governmental organizations.
Results/ Impact of practice	The Centre conducts research and introduces programs in the areas: • social involvement in climate action, • methods of social impact related to climate change mitigation, • pro-community, • adaptation to new environmental conditions. • development of tools and evaluation of public climate education programs and popularization of knowledge, • development of application and educational programs to popularize knowledge about creating

	climate-resistance neighborhoods, including climate-resistant university campuses. • research projects and implementation of psychological support programs: preventive and corrective programs related to the consequences of climate change for mental health. Scientists of SWPS University share their knowledge online and offline through meetings, blogs, lectures and podcasts performed by SWPS University experts and invited managers or entrepreneurs by YT channels divided into zones themed: Psyche Zone, Law Zone, Design Zone, Management Zone. Some of the topics covered include digital ecology, circular economy, urban beekeeping, zero waste, energy law, activism proclimate, dealing with the so-called climate anxiety. Students are also involved in educational activities. Since the academic year 2020/2021, the Pro-eko Science Club has been operating whose task is to deepen knowledge and skills in the field of ecology and care for the environment, look for ways and methods to use knowledge in practice, as well as integrate students around ecology and caring about the environment.
Engaged stakeholders	Students, educators, entrepreneurs, managers of companies
Pedagogical approach(es) that is adopted through this practice	Research conducted Lectures, interviews, discussions published on YouTube channel Scientific club for students
Links – online info	https://swps.pl/nauka-i-badania/poznaj-nasz-potencjal/centra-badawcze/874-instytuty-naukowe/instytut-psychologii/centra-i-laboratoria/28577-centrum-dzialan-na-rzecz-klimatu-i-transformacji-spolecznych https://web.swps.pl/strefa-designu/blog/25072-meblujemy-miasto-smart-podcast

	https://ekokampus.fjk.org.pl/wp-content/uploads/eko-kampus-2021.pdf

4.3.5. Eco-citizenship practices in HEIs in Portugal

Responsible partner that collected the practice	ZERO
Country of the best practice initiative	Portugal
City of the best practice initiative	Lisboa
Topic/ Title of practice	Master's in design for Sustainability
Level of application (Local/ regional/ national)	Regional
Name of institution or SE-related department that implements the practice	Master in association with the Faculty of Sciences, the Institute of Social Sciences and the Higher Institute of Economics and Management
Level of study:	Master's programme
Type of practice	A master programme
Objectives of practice (a summary)	Providing postgraduate training in design within the context of sustainable development, as defined by the interdisciplinarity of environmental, social, and economic sciences, is one of the main objectives of the Master of Design for Sustainability. To design, develop, and implement projects at the local, regional, and global levels within the framework of the United Nations Sustainable Development Goals, it is important to promote reflection on and discussion of specific sustainability issues in 2015. Additionally, it is important to develop real-world design projects in

	collaboration with public and private organizations with the aim of achieving environmental, social, and economic sustainability.
Results/ Impact of practice	Students will be able to create solutions that address sustainability issues because of this experience, allowing them to apply the theoretical knowledge they have learned in the program to practical situations. Overall, it is anticipated that the program will have a transformative effect on the students who take part in it by giving them the skills, experience, and knowledge required to become leaders in promoting sustainability in their future careers. The program is likely to positively affect society as a whole by promoting sustainable practices and aiding in resolving some of the most urgent environmental, social, and economic issues our planet is currently facing.
Engaged stakeholders	Educators, students and policymakers
Pedagogical approach(es) that is adopted through this practice	A multidisciplinary approach, including real-world design projects and theoretical and practical methods, is used in the Master in Design for Sustainability program. To help students acquire the knowledge, skills, and experience needed to address sustainability challenges in their future careers, it strongly emphasises critical thinking and reflection.
Links – online info	https://www.belasartes.ulisboa.pt/en/cursos/mestrados/design-para-a-sustentabilidade/

Responsible partner that collected the practice	ZERO
Country of the best practice initiative	Portugal

City of the best practice initiative	Porto
Topic/ Title of practice	Environmental Economics and Sustainable Development
Level of application (Local/ regional/ national)	Local
Name of institution or SE-related department that implements the practice	Faculty of Economics of the University of Porto
Level of study:	Master's programme
Type of practice	A course
Objectives of practice (a summary)	The concepts and research methodologies thought to be more pertinent in environmental economics and the field of sustainable development and its indicators will be introduced to the students. The themes that make up the program are mainly two major topics in a master's course that focus on economics and environmental management in the first semester. On the one hand, a first block syllabus introducing environmental economics themes ensures that students are prepared in this field. Second, the student is given a presentation on the topic of sustainable development along with the fundamental methodological underpinnings for an understanding of its central significance at the international, national, regional, and enterprise level. Thus, it aims to prepare students for any workplace setting as well as, more immediately, for the potential need for case studies and future material development, particularly in the context of a potential master's thesis.
Results/ Impact of practice	After the course has been approved, the students should be ready to comprehend the new challenges and hone

	their skills in various connections between the environment and the economy.
Engaged stakeholders	Educators, students, and policymakers
Pedagogical approach(es) that is adopted through this practice	Learning is based on theoretical and practical approaches, focusing on student participation and their contributions to the topics being taught. The methodology used combines the presentation of economic theories concerning the environmental field with real-world examples that show how the issues being discussed are relevant. This is meant to promote discussion in the classroom and prepare topics for presentations and further discussion. One of the main focuses of this participation relates to a model where students are a priori given specific tasks, and divided into research groups, each representing a theory or a line of concrete thinking. Then the participants have a lengthy discussion about the tasks in question. In this model, the teacher essentially serves as the debate's moderator, gathering the conclusions that are thought to be the most pertinent to the teaching process moving forward. Students will feel more comfortable with the work group and with a broad preparation of critical analysis as a result, and they will feel more encouraged to be given more prominence in the class. There will be an added attribution that will support this. Given the resources available, another option to consider is to bring in subject-matter experts and students working on their master's theses to demonstrate the real-world applications of the lessons learned.
Links – online info	https://sigarra.up.pt/fep/en/UCURR_GERAL.FICHA_UC_VIEW?pv_ocorrencia_id=351273

Responsible partner that collected the practice	ZERO
Country of the best practice initiative	Portugal
City of the best practice initiative	Lisbon
Topic/ Title of practice	Postgraduate Diploma in Social Responsibility and Sustainable Development
Level of application (Local/ regional/ national)	Local
Name of institution or SE-related department that implements the practice	Faculty of Humanities of the Catholic University of Lisbon
Level of study:	Postgraduate
Type of practice	Postgraduate
Objectives of practice (a summary)	-Educate and train professionals in the fundamentals of sustainability and social responsibility at the national and international levels. -Promote knowledge of the 2030 Agenda for Social Responsibility and Sustainable Development's key themes. -Educate and train professionals in the use of sustainable and responsible social management techniques. -Hone theirdesign and implementation skills for sustainability and social responsibility programs and plans.
Results/ Impact of practice	In general, the Postgraduate Diploma in Social Responsibility and Sustainable Development is anticipated to significantly impact the professionals who take part in it by giving them the skills, experience, and knowledge required to advance sustainability and social responsibility in their fields. In turn, encouraging

	sustainable behaviours and assisting in the realisation of the Sustainable Development Goals of the United Nations, is likely to have a favourable effect on society as a whole.
Engaged stakeholders	Associations, employers, associations, students and teachers from different training areas (law, psychology, social responsibility and sustainability, social economy, entrepreneurship, business, communication, leadership, management,...)
Pedagogical approach(es) that is adopted through this practice	The Postgraduate Programme in Social Responsibility and Sustainable Development consists of several modules, with a theoretical and practical component, treated in an integrated manner. The tutorials in the format of Project Work, allow supporting the realization of an individual final work that fits the contents of the different modules.
Links – online info	https://fch.lisboa.ucp.pt/pos-graduacao-em-responsabilidade-social-e-desenvolvimento-sustentavel

Responsible partner that collected the practice	ZERO
Country of the best practice initiative	Portugal
City of the best practice initiative	Lisbon
Topic/ Title of practice	VI Summer School on Sustainability
Level of application (Local/ regional/ national)	National

Name of institution or SE-related department that implements the practice	partnership between Observa/Institute of Social Sciences-University of Lisboa, ZERO and APREN
Level of study:	open to: Members of associations, Management technicians, Professionals in business, Researchers and scientists, Master's and PhD students, Other stakeholders with professional l, academic and/or civic activity in the area
Type of practice	Summer school
Objectives of practice (a summary)	• to promote the theme of sustainability and its integration in decision-making in everyday life, among the technical managers of different organizations and institutions, in order to enable them to respond to the challenges that the construction of a sustainable society implies. • Promote reflection and sharing of solutions that ensure a fair transition to a carbon neutral economy based on the principles of sustainability, at a key moment for the EU and the Member States in terms of the availability of resources and their articulation with a new political agenda. • Explore the interconnections between science, economics, management, politics and society and promote contact between different specialists and interlocutors representing different sectors of society. • Create the conditions for participants from different areas to explore different proposals and to establish contact networks for future interventions in favor of building a sustainable society. • To affirm the Summer School in Sustainability as an initiative of relevant interest to Portuguese society, for its specific contribution in opening new horizons and providing participants with new tools and skills

	to understand the complexity and interrelational nature of current and future society .
Results/ Impact of practice	Encourage the further development of pressing and cross-cutting issues, this year centred on the energy transition, taken from a systemic perspective, social, environmental, political and economic perspectives
Engaged stakeholders	Associations, municipalities, national authorities, policymakers and business representatives
Pedagogical approach(es) that is adopted through this practice	lectures, advanced in-depth discussions with different stakeholders and field trips
Links – online info	https://www.ics.ulisboa.pt/en/escolas-de-verao/sustainability

Responsible partner that collected the practice	ZERO
Country of the best practice initiative	Portugal
City of the best practice initiative	Lisbon
Topic/ Title of practice	Sustainability Week
Level of application (Local/ regional/ national)	Regional
Name of institution or SE-related department that implements the practice	University Institute of Lisbon
Level of study:	All
Type of practice	A series of workshops and seminars

Objectives of practice (a summary)	Promote a reflection on the role of Higher Education Institutions for the digital and climate transition, debating the most relevant aspects of the opportunities and challenges of this transformation. To extend the reflection to the Iscte academic community, among other initiatives, an Exhibition on the Sustainable Development Goals will also be held, as well as a tour of the Iscte Campus - SDG Route, a Masterclass on the use of waste in art and design and the construction of a work of art made of waste.
Results/ Impact of practice	These initiatives contributed to building a more sustainable campus community and fostering a culture of sustainability.
Engaged stakeholders	Educators, students, staff, employers, associations and policymakers
Pedagogical approach(es) that is adopted through this practice	Exhibitions, master classes, hands on, plogging, workshops and conferences
Links – online info	https://www.iscte-iul.pt/eventos/2934/semana-sustentabilidade

4.3.5. Global best practices of Eco-citizenship practices in HEIs

Regarding eco-citizenship-related best practices that have been identified globally outside the EU, similar trends have been observed. However, we noticed in our research the existence of more interdisciplinary programmes that run simultaneously with the students' main studies and complement them. Two examples of such practices are presented below:

Eco-citizenship best practices outside the consortium countries

Responsible partner that collected the practice	Hub-21
Country of the best practice initiative	USA
City of the best practice initiative	Grand Rapids

Topic/ Title of practice	Calvin Environmental Assessment Program (CEAP)
Level of application (Local/ regional/ national)	Local/regional
Name of institution or SE-related department that implements the practice	Calvin University
Level of study:	Bachelor's
Type of practice	A service-learning educational program
Objectives of practice (a summary)	In this innovative programme, faculty dedicate a regular lab session or project to collecting data that contributes to an overall assessment of the environment of the campus and surrounding area. Classes form working teams related to particular environmental issues. The data forms the basis for recommended changes in campus policies, for programs that target individual behavioural changes, and for identifying issues that involve and impact the adjacent neighbourhoods. The program is dramatically increasing natural science faculty and students' involvement in service-learning. CEAP is developing a model that can be used by other colleges and universities to move faculty to greater engagement with the local community.
Results/ Impact of practice	To increase students' and faculties' engagement, particularly in the field of sciences, in Service-Learning methodology to engage students in meaningful learning in a real-life context in terms of application of course material and group work environment,

	to use the first two goals to provide a context in which students, faculty, and the administrative planning process on campus are meaningfully linked with the surrounding community, to provide data for an overall environmental assessment of Calvin University and its surrounding neighbourhoods. to engage students at all levels and across disciplines in quality research
Engaged stakeholders	Students, educators, university staff
Pedagogical approach(es) that is adopted through this practice	Service-Learning
Links – online info	https://calvin.edu/about/sustainability/ceap/

Responsible partner that collected the practice	Hub-21
Country of the best practice initiative	USA
City of the best practice initiative	Eugene, Oregon
Topic/ Title of practice	Environmental Leadership Program
Level of application (Local/ regional/ national)	Local/regional
Name of institution or SE-related department that implements the practice	University of Oregon
Level of study:	Bachelor's Master's
Type of practice	Community-based learning program

Objectives of practice (a summary)	The Environmental Leadership Program is an interdisciplinary community-based learning program that matches student teams with non-profit organizations, government agencies and businesses to address community-defined environmental issues.
Results/ Impact of practice	Goals are to provide: Undergraduate students with unique and practical learning experiences that develop their professional, leadership, technical, problem-solving, collaboration, and communication experience and skills; Graduate students with project management, mentoring, and team-building experience and skills; and Organizations with high-quality services that further their missions.
Engaged stakeholders	Students, educators, university staff, local organisations
Pedagogical approach(es) that is adopted through this practice	Community-based learning
Links – online info	https://socialsciences.uoregon.edu/envs/hands-on/leadership

5. CASE STUDIES OF NATURE-BASED SOLUTIONS INTEGRATION IN HIGHER EDUCATION INSTITUTIONS

In this chapter we present a set of case studies which provide insights into the ways higher education institutions (HEIs) including their social economy (SE) departments integrate active learning in environmental sustainability and Nature-Based Solutions (NBS) in their settings. These case studies highlight diverse pedagogical approaches, overcoming interdisciplinarity and trans-disciplinarity challenges, and provides strategies and examples for modernizing

sustainability education especially useful for SE faculties to upscale their role as a main driver of the green transition.

These case studies demonstrate the significant role of HEIs in promoting environmental sustainability and NBS education. Pedagogical diversity allows students to engage in practical projects, fostering teamwork and awareness of personal responsibility. Overcoming interdisciplinarity challenges is facilitated by involving various backgrounds in teaching and including various stakeholders through hands-on approaches.

Bottom of Form

These case studies can serve as valuable examples for other institutions looking to incorporate active learning in environmental sustainability and particularly NBS in their educational settings. Besides providing best practices across the project partner countries, these case studies point out different interdisciplinarity & transdisciplinary challenges for implementing NBS in HEIs, also providing overview of different approaches that can be used to overcome them.

Case studies included in this chapter are listed in the table below, together with institutions which delivers these forms of education and country where they are situated in. Studies are prepared through interviews with stakeholders, so the number of interviews conducted for each of the case studies is listed in the last column. As it can be seen from the table, best practices include different levels of education, from summer schools and courses delivered at different levels of education. Most of them include several institutions given the interdisciplinarity of the field.

Table Case studies overview

Case study	Institution(s)	Country	Number of interviews
Course „Change management“	University of Zagreb, Faculty of Economics and Business (Croatia)	Croatia	5
HEIght Innovation Toolkit	European Institute of Innovation and Technology, University of Central Lancashire (Cyprus campus), The Malta College of Arts, Science & Technology, Özyeğin University (Turkey) and the	Cyprus	4

	National Centre of Entrepreneurship in Education (UK)		
Course "International and European Environmental Governance"	School of Law, Aristotle University of Thessaloniki (open for enrolling as elective course for all other students at Aristotle University)	Greece	4
Nisyros GeoPark Summer School	Faculty of Geology and Geoenvironment of the National and Kapodistrian University of Athens and the *UNESCO* Chair Conservation and Ecotourism of Riparian and Deltaic Ecosystems of the International Hellenic University	Greece	4
The Inter-University Climate Academy	Stanislaw Staszic University of Science and Technology in Krakow, the Warsaw School of Economics and the University of Wroclaw	Poland	3
ECOCITY 3-year Bachelor's degree	University of Lodz: Faculty of Biology and Environmental Protection and the Faculty of Economics and Sociology	Poland	2
MSc in Law and Economics of the Sea - Ocean Governance (MDEM) and Ocean School	NOVA School of Law and the NOVA School of Business and Economics	Portugal	3
HortaFCUL project	Faculty of Sciences, University of Lisbon	Portugal	4

5.1. Case Study – best practice from Croatia

NBS Best practice in Croatia: The course Change management at the Faculty of Economics and Business, University of Zagreb[1]

Introduction

[1] Case study is prepared by project partner UNIZG based on teaching materials from the Change management course and inputs from interviews conducted with the professor, teaching assistant and three students.

If you think you are too small to make a difference, try sleeping with a mosquito in the room.
Dalai Lama

Economists bear a significant responsibility in the society. While their primary objective may be profit-maximization, it is crucial that these profits are utilized for the betterment of the society. Each economist has the potential to create meaningful change. The aim of the course Change management is to initiate change at four distinct levels - change within ourselves, change within the team, change within the organization, and change within the society.

The course is based on learning about social responsibility by integrating students into society and fostering the sense of social cohesion. It includes a combination of academic and practical experiences, as well as active engagement with the community through civic education, service-learning, and volunteering. As a part of this course, students gathered in teams must complete a socially and environmentally responsible assignment of developing and implementing a feasible project of a social value.

Through the years, many projects were developed and implemented while many of them included green practices. Nature based solutions (NBS) have held a central position in the course. NBS initiatives developed and implemented within this course have effectively addressed various societal challenges including enhancing human wellbeing and health, ensuring food security and mitigating climate change. Moreover, developed NBS projects have also been used to address circularity by minimizing pollution and waste, extending product lifecycles and facilitation of sharing of physical and natural assets. Thus, within the context of this course NBS occupy a central position.

Best practice elaboration

The course Change management is an elective course of the Integrated undergraduate and Graduate university study programme at Faculty of Economics and Business - University of Zagreb in Croatia. Apart from traditional teaching about global challenges, the course provides first-hand knowledge to address local challenges and empowers students for action through practical experience.

In order to foster collaboration and teamwork, all assignments are to be completed in teams of up to 8 people. During the first two weeks of semester every team of students has to plant a tree. This is the first change students make in the world while they get to know each other and learn to collaborate as a team. In addition to compulsory tree planting assignment, students are further encouraged to contribute virtually to environmental protection by setting their default search engine to be https://www.ecosia.org. Ecosia donates a significant portion of its advertising revenue towards tree planting projects around the world. This collective effort demonstrates the course's commitment to environmental consciousness.

Once the teams are formed, the main task of each team is to develop and implement a feasible project of social value. First, the team brainstorms the ideas focused on different societal issues including actions towards preserving the environment, solving problems in local communities, or educational workshops in schools on preserving the environment. Throughout the process students are given instructions, offered mentorship, and taught on how to work in a team. Development and the implementation of the project is monitored through 7 formal assignments students have to complete:

1. Brainstorming and selection of 3 best project ideas
2. Pitch – students have to pitch the chosen project idea in 2 minutes to their professors and colleagues
3. The initial project proposal – written document that students are required to submit in order to receive feedback from their professors. It includes project title, description, vision, mission, project goals, action plan and SWOT analysis. Students are offered mentors to give them guidance in the process. Based on the project topic, professors connect students with experts from various fields, including entrepreneurs, sportsmen, and celebrities.
4. Extended project proposal – elaborated document based on feedback from professors which includes project title, team name, team members, team leader, project mentor, project sponsor, beginning and ending date, vision and mission, project summary, goals, action plan, stakeholders, SWOT analysis, project budget, project risks, other required resources.
5. Project presentation in class after the project completion
6. Project summary – written report which includes general information on the project, project summary, achieved goals, lessons learned, project sustainability, achievements and challenges and project self-assessment.
7. Team members' evaluation – team members evaluate one another

Additionally, each team is required to submit a weekly report on the progress of their project. Some of the NBS projects implemented during the course are focused on various areas, such as ecological restoration, forest landscape restoration, human health and well-being, combating the pollution, biodiversity and natural species migration. NBS projects often include different stakeholders such as professors, students, teachers and pupils, kindergarten-aged children, volunteer associations, non-profit institutions, and private corporations. Table 1 gives an overview of some of the NBS projects implemented in this course.

Table 1. Selected NBS projects implemented within the course Change management

Project title	**Description of the NBS project implemented within the course**
Cleaning up local parks	The team organized a collective clean-up of the waste in Zagreb's parks. To encourage broader participation among students and citizens in general, the team shared project-related information on social networks and

	designed a poster. Through these efforts, the team not only rose awareness about proper waste separation but also promoted a sustainable and healthy lifestyle.
Cleaning up wild waste dumps	The initiative was on finding illegal dumping sites where various types of waste, including construction debris, bulky items, mixed municipal waste, and plastic, are irresponsibly discarded and organize as many cleanup actions. Additionally, the aim was to raise awareness and encourage community members to report any suspicious activities related to waste disposal. The team cleaned up 4 illegal dumping sites, cooperated with other volunteer associations, ran a survey on citizen' ecological awareness and learned about proper waste disposal and recycling.
Eco class	A team of 7 students, supported by 2 professors, a mentor, and a sponsor, conducted environmental workshops for primary and secondary school children. The objective was twofold: to raise awareness about climate change and importance of eco citizenship and NBS, and on the other hand to instill sustainable habits such as recycling, adopting eco-friendly diets, and reducing waste. Through their efforts, they successfully reached over 100 young individuals, educating and influencing them to change their attitudes towards the environment.
Green for Green	The project was to educate students and the general population about the importance of natural solutions for health protection and in this way supporting small family firms and small entrepreneurs that develop such solutions. Students recognized that there are many traditional healing practices based on medicinal substances of natural origin, so their intention was to support the use of plants as traditional remedies instead of just man-made versions of medicines. As a part of this activity, students have organized workshops on aromatherapy and healing herbs. During the workshops, besides giving presentations, educational quizzes and education on the use of different plants, students invited producers, small entrepreneurs and family farms, to present their products, supporting in this way the development of new markets for family farms. Students also helped small entrepreneurs to grow their businesses by preparing digital flyers, social media management, preparing marketing plans and product label designs and assisting with pricing and new price lists. Overall, students managed to increase awareness about health issues and herbal medicine, provided information on natural solutions for disease prevention among targeted population and enhanced general wellbeing.

Landscaping of the school courtyard	With the sponsorship of a local company, students successfully obtained and planted trees within the courtyard of an elementary school in Zagreb. The school was specifically chosen because of its previous involvement in the "Fruit tree plantation drive" organized by the Ammucare Charitable Trust (ACT), which aimed to plant 100 000 trees worldwide. The primary objective of the project was to create a natural and ecologically sustainable environment for safety and well-being of children.
Responsibility of the youngest for creating a sustainable community	The team of students conducted workshops in kindergartens to educate children about environmental protection and NBS, proper waste recycling, and embracing an environmentally conscious lifestyle from an early age. Through engaging activities, interactive games, and hands-on tasks like creating their own separation containers, the team effectively taught the participants about the significance of socially responsible behavior.
Save the birds	The project was to provide feeding houses for birds throughout the city. By ensuring a steady food supply for birds in wintertime, the aim was to promote environmental preservation and safeguard the well-being of plants, animals, and people.

Source: Authors based on project database and inputs from interviews conducted with the professors and students of the Change management course

The implemented projects have yielded beneficial impact on all stakeholders. By engaging in projects of environmental and social value, students have become aware of the importance of teamwork, embracing diversity, and adapting to different situations. They have learned to take responsibility, embrace risks and developed various skills, including organization and public speaking. They have realized that making a difference does not always require substantial efforts or resources, and working as a team is often more effective than working individually. Through their experiences, students have embraced new, greener habits and have become more conscious of their individual responsibility in protecting the environment. Their increased commitment to environmental preservation has also inspired others to follow.

Pedagogical approach/es used

The course curriculum incorporates various pedagogical approaches to deliver the course content effectively. Key focus of this course is on socially responsible learning which encourages students to engage with complex environmental and societal issues. The curriculum aims to raise awareness for local and global environmental issues and fosters environmental citizenship among students. Significant emphasis is placed on NBS, thus requiring hands on approach to encourage students to reinforce the learning experience.

Therefore, the course employs a combination of traditional lectures and practical experiences. It includes hands-on projects of writing a business plan and implementing a socially & environmentally responsible project by providing expertise and volunteer time to existing organizations. Students learn how to develop and pitch the project proposal to the targeted audience. They learn to recognize opportunities and are being equipped with the knowledge on teamwork, sustainable business models, measuring outcomes and scalability potentials of their projects.

Some of the pedagogical approaches used in this course are:

- **Service-learning**. Through service-learning students participate in NBS projects within social economy. They apply their classroom knowledge and skills to real-world situations, fostering personal and social growth while making positive contributions to their communities.
- **Project based learning.** Students need to develop and implement a feasible NBS project to reduce the environment impact and promote sustainable practice.
- **Teamwork**. The course actively promotes collaborative learning through team-based activities and projects. Students learn to work effectively in teams, which includes learning about active listening, stages of team development, guiding a team and establishing team rules. Additionally, students learn strategies for managing conflicts that may arise within teams. Students actively participate in team-building assignments designed to foster cohesion and collaboration. Apart from tree planting, each team needs to establish team behavior rules and solve the Barter puzzle, which is used to determine different roles in the team. Each team is assigned a puzzle to solve, with different parts of the puzzle held by other teams. To successfully solve the puzzle, students must rely on their ability to identify mutual needs and engage in mutually beneficial exchanges with other teams. This activity fosters creative problem-solving, negotiation skills, and promotes cooperation among students.
- **Seminar.** Students have to write an “antiseminar” on the failure of a notable individual, whether from the business world, a scientific field, or any other public figure. The objective of the seminar is to show that the path to success is filled with many challenges, and highlight the significance of belief in one's own vision. It is crucial to adopt an open mindset that embraces mistakes as opportunities for growth and learning.

It is important to highlight that professors have not received formal training in teaching methods specifically tailored for the green transition and the implementation of NBS. Therefore, all the initiatives and pedagogical approaches previously mentioned are a result of their individual efforts and initiatives.

Opportunities and challenges met through course integration in HEIs

The institutional support for implementing NBS is not strong in Croatia. There is no framework to incorporate NBS into the curriculum. The implementation of NBS does not require significant digital tools and resources, but it often requires financial and other resources, which are not provided by educational institutions. Such resources can be obtained through sponsorships and donations. With increasing public awareness about environmental issues, companies are more eager to participate in projects related to environment preservation. This shift in attitudes gives an opportunity for cooperation. However, students may have difficulties when approaching potential sponsors and need guidance from professors and assigned mentors (experts from various fields, including entrepreneurs, sportsmen, and celebrities). Mentorship also plays an important role in providing guidance throughout the project.

The successful implementation of NBS calls for an interdisciplinary approach, recognizing that economists alone may not have sufficient knowledge on NBS. Involving students from various areas of expertise would lead to understanding of the ecological and economic aspects of NBS and the best possible outcomes.

Prior to enrolling, students generally have limited awareness of the benefits and opportunities associated with the green transition. However, through their experience in the course, their become aware they can make a change in the world.

Conclusion

Academic institutions play a crucial role in educating socially responsible and engaged citizens and actively contributing to the improvement of the quality of life within local communities. Apart from traditional teaching about global environmental and social challenges, the course Change management provides knowledge to address local challenges and empowers students for action through practical experience. As a part of this course, students gathered in teams must complete a socially and environmentally responsible assignment of developing and implementing a feasible project of social value, possibly a NBS. NBS projects implemented within the course are focused on various areas, such as ecological restoration, forest landscape restoration, human health and well-being, combating the pollution, biodiversity and natural species migration.

Working on projects of social value, students have become aware of the importance of teamwork, embracing diversity, and adapting to different situations. Through their experiences, students have embraced new, greener habits and have become more conscious of their individual responsibility in protecting the environment. They have come to realize that true change begins from within ourselves.

5.2. Case Study – best practice from Cyprus

NBS Best practice in Cyprus: HEIght Innovation Toolkit[2]

Introduction

The HEIght Innovation Toolkit is an initiative of a pan-European consortium of four forward-thinking higher education institutions (HEIs) and the European Institute of Innovation and Technology (EIT). More specifically, the consortium consists of the University of Central Lancashire, UK, which coordinated the project from its UCLan Cyprus campus, The Malta College of Arts, Science & Technology (MCAST), Özyeğin University in Turkey and the National Centre of Entrepreneurship in Education in the UK (NCEE). The EIT was created with the recognition that a competitive, knowledge-based economy capable of sustainable growth requires the integration of the three sides of the so-called Knowledge Triangle. Knowledge Triangle integration involves activities in education, innovation, and business creation. By bringing the three sides of the Knowledge Triangle closer together, EIT enables the innovation that will help Europe flourish economically while looking towards Nature-based Solutions (NbS) and growing sustainably.

HEIght delivers on the consortium's shared vision of prosperous, inclusive, and climate-resilient societies where sustainable, trusted, and healthy food systems and other areas of human activity contribute to net zero carbon emission economies. Through training designed and tailored to developing innovation and enterprise, these activities support the development of academic and non-academic staff and students. The Innovation Toolkit forms a tool for transformative change beyond the project's life. The aim was to create a vibrant ecosystem for the students to develop their entrepreneurial mindset and enable them to develop their green ideas and turn them into innovative products/services or businesses that also incorporated Nature-based Solutions.

Best practice elaboration

The HEIght Innovation Toolkit was an optional, extra curriculum course offered to all students of UCLan Cyprus. The course lasted five days and included lectures, presentations, speeches, team collaboration and feedback. At the end of the project, participating students and their teams were given an additional week to develop their ideas and submit a business plan detailing

[2] Case study is prepared by project partner Synthesis Center for Research and Education through Interviewing four (4) people in total. Two (2) teachers of the course, and two (2) students.

the growth of their idea step by step. The submitted ideas were evaluated, and the winning team received a monetary prize that was split among the students.

Looking at the course description and the material given to students, it became clear that the term Nature Based Solutions (NBS) was never introduced. In fact, during interviews about the project, teachers and students were unfamiliar with the term. However, looking closely at the materials, it was evident that Green Entrepreneurship and Green Innovation, as they called it, included a lot of NBS approaches and ideas, and many NBS business solutions and practices were introduced and discussed during the course, which led to the development of innovative ideas that directly fall under the umbrella term of Nature-Based Solutions. After explaining the term to the stakeholders, they quickly understood what NBS was referring to and demonstrated how the course enabled them to understand better and act on such business ideas that incorporated Nature-Based Solutions.

As the course defined it:

"**Green entrepreneurship** is the activity of consciously addressing an environmental/social problem/need through the realisation of entrepreneurial ideas with a high level of risk, which has a net positive effect on the natural environment and at the same time is financially sustainable."

"**Green innovation** refers to all aspects of innovation related to green products and processes, including energy saving, pollution management, waste recycling, product design and environmental management."

The course had two very clear aims. The first one was to teach students about business, about entrepreneurship more precisely, and how to take their ideas, put them down on paper and figure out if they can be turned into profitable enterprises that can be developed through specific steps and actions into a business starting from nothing. The second aim was to ensure that all the ideas developed were "green", as they called them. This green approach was achieved through the introduction of the 3P dimension, which includes people (social), the planet (environmental), and profit (financial). The goal was to demonstrate to students how they can develop such ideas and still make them profitable. From the very beginning of the course up until the very end, all the material always refers to green businesses and startups and the benefits they have, as well as the pitfalls they face that students needed to be aware of so they could establish a successful business plan by the end of the course. There were many specific examples, both local and international. They also had guest speakers, as well as excursions to local green businesses where they got to interact with business owners, see their work, and ask them questions. The course also heavily relied on teamwork and pushed the participants to work in teams to develop their ideas, bringing together students across all the

university disciplines, not just business students. The majority of the ideas that resulted from these teams incorporated NBS into their businesses.

Pedagogical approaches

Since the course took place on university grounds and the teachers who created the curriculum had access to experts from various fields, a plethora of pedagogical approaches were used during the course. As mentioned above, the course aimed to bring together students across all the university disciplines, and therefore, it was open to all students of all degrees.

Because of this variety, one of the first methods employed during the course was a more traditional teacher-centred approach, where the students sat through lectures and presentations on business, planning, entrepreneurship and innovation, and green ideas. At this stage, the university aimed to ensure all students understood the basics. During this time, they also formed teams to create balanced groups that included participants from all fields of study, as they believed such interdisciplinary teams would generate better business ideas. It is important to mention that at the end of each day during the first three days of the course, there was a questionnaire that every student had to fill in. This questionnaire was a way for the teachers to ensure the students grasped the essential concepts presented that day.

At the end of each lecture or presentation by local entrepreneurs invited, the students got to ask questions, thus incorporating an inquiry-based learning approach, where the students could direct the discussion either in areas they had trouble understanding or subjects they found more interesting. These discussions also enabled the students to start thinking about their green business idea in greater detail as they tried to figure out all steps in launching the business and making it profitable.

The course was repeated four times over the course of two years. Each time they had an excursion to a local business that was considered green, the students got to meet the people working and running the business and speak with them about their venture. The students and teachers saw experiential learning methods that included concrete, real-life examples as highly valuable. There was also a vital element of collaborative learning, especially in the second half of the course, as the teams were formed, and the students spent time developing their ideas. By day four, students were expected to present their new ideas to their classmates and teachers and receive feedback, which suggests a constructivist approach to learning.

Towards the final day of the course, and during the week following, when the students were expected to finalise their idea, something closer to the Montessori pedagogical method was used. Each team was expected to take all they had learned and build upon it by conducting further research and figuring out how to make their business viable. Of course, their teachers

remained available for comments and feedback during this period. However, any learning during this second week was primarily self-directed based on each team's business idea.

Opportunities and challenges

As highlighted by the teachers interviewed, the immediate and apparent first opportunity is a great interest in using the term Nature-Based Solutions. The term should be included in future projects as it directly addresses the issue. An introduction to the term, as well as material around it, would be beneficial and helpful to them and the course participants. They already include many examples that are Nature-Based Solutions. However, they referred to them as green ideas, a much broader concept, and specificity is something they found to be very important when explaining green entrepreneurship and innovation to students.

Students generally saw the course as a great opportunity, not only because of the valuable information it provided but also because it offered a certification from the university, acting as proof of their knowledge of the subject. The certification can be used when looking for a job to demonstrate interest and knowledge in helping a business develop the 3Ps and greener operations, production, and product development methods. Students have also commented that the market is changing, and employers are looking for knowledgeable employees regarding green businesses. The teachers agreed with this notion, so they focused on “Green Entrepreneurship” during this course, believing it is the future. It gives their students an edge when going out into the job market. The term intrapreneurship, which refers to a system that allows an employee to act like an entrepreneur within a company, is a term that was included in the course materials. A course that could certify teachers in Nature-Based solutions was an interesting addition from the teachers’ side. As they explained, they are actively involved because they understand the importance of the subject and want to transfer the knowledge to their students. However, few teachers are certified in teaching ideas such as green innovation and Nature-Based Solutions.

From the teachers’ point of view, they wished they had more excursions, so they could offer the students more real-life practical examples of local green businesses that have been successful. It was noted that in all four times the course ran, the students showed great interest in the green business ideas but also strongly resisted the possibility that it was attainable, something that almost always changed by the end of the course as they saw examples and were given the tools and methods to come up with their idea and evaluate it. Students also echoed this recommendation, adding that they wanted more time dedicated to the feedback on their ideas from the teachers. The sentiment was that while the feedback they received was valuable, it was short and didn’t allow further exploration or attempt to resolve any problems pointed out during the short feedback session.

The students also pointed out that they would have preferred if the teams were set up earlier in the course, as their teams were announced by day four. They would have preferred to have had more time to get to know their teammates and discuss ideas. The teachers echoed the sentiment but explained that this was impossible, as they had to wait until everyone registered, showed up, and then divided them into teams. Otherwise, they ran the risk of having imbalanced teams or teams that needed members. This would have been a different story if this university course was part of the curriculum and, therefore, obligatory.

Conclusion

Overall, the HEIght Innovation Toolkit positively impacted the students that participated, and they seemed eager to learn more. The teachers pointed out that they do not receive any specific government incentive or push to include such materials in their business curriculum, and things would have been better if they did. All subjects relevant to sustainability and climate change currently included in the curriculum are only there because the teachers can design some courses as they want, as long as they cover the material the government requests, which in the case of Social Economy it is not focused on NBS or any green and sustainable ideas.

The evidence gathered from the interviews shows considerable room to integrate NBS teachings into social economy classes in HEIs in Cyprus, and both teachers and students welcome the idea with open arms. Students who have attended the HEIght Innovation Toolkit said it was beneficial. Looking at the materials taught, examples shown, and some of the ideas that came out of the course, we find notions that include eco-tourism, upcycling, composting and organic waste management, sustainable agriculture, green infrastructures, and urban green spaces.

It is clear that working in teams and finding solutions to the many difficulties any new enterprise can face is a net positive for everyone involved. It is also essential to include local business examples and clearly demonstrate how they achieved their success. Interactions with the owners of businesses using NBS themselves are also valuable, as it helps show the students that this is possible and not just a wild dream. Providing dedicated time for feedback or even helping students overcome specific fears or lack of knowledge about Nature-Based solutions and business ideas is necessary, and offering certification for both teachers and students is perceived as a great benefit and a good enough reason to join such extracurricular courses. In conclusion, there already is a demand for more education that focuses on Nature-Based Solutions and any material created for this subject matter would be greatly welcomed by HEIs.

5.3. Case Studies – best practices from Greece

5.3.1. Best practice from Greece (1)

NBS Best Practice in Greece: "International and European Environmental Governance", School of Law, Aristotle University of Thessaloniki[3]

Introduction

Nature based solutions are useful tools to enhance nature's protection, management and restoration. Law and policy could play a significant role in the implementation of NBS by creating obligations for protecting the environment, promoting sustainable development and restoring nature. A country's legal and policy framework defines everyone's role, rights and responsibilities and creates the necessary mandates for enabling NBS in accordance with the international and regional legal and policy frameworks. Thus, lawyers have an important role to play in creating obligations regarding NBS and enhancing their implementation at local, national and regional levels.

Our preliminary research on NBS' inclusion in Greek HEIs has demonstrated that NBS are largely out of the scope of the universities' curricula, or they are taught in the line of the courses, but without forming a special course topic. Law Schools in Greece follow a rather traditional approach in teaching environmental courses, if taught at all, as environmental law is hardly an obligatory course. The traditional approach uses lectures focusing solely on hard and soft law documents, such as conventions, agreements, resolutions etc. However, it is necessary that law students are familiarized with new tools offered in the field of environmental protection and sustainable development and explore new paths in reforming the legal and policy framework on nature's conservation by incorporating a more interdisciplinary approach.

Recognizing the above mentioned lack of knowledge of NBS issues among the new law students, the instructors of the course "International and European Environmental Governance" have included in their lessons NBS as a necessary topic for familiarizing law students with new tools in the field of environmental protection and nature's restoration.

The course "International and European Environmental Governance" is a respectively new course included in the undergraduate programme of the School of Law, Aristotle University of Thessaloniki. It is offered by the Department of International Studies to undergraduate students who are in the 3rd year (and above) of their studies. It is an open and elective course,

[3] The case study was prepared by UOM based on the materials gathered from the course's university webpages and from the interviews conducted with stakeholders: one of the instructors and three students.

which can be selected by the students of other Faculties and Schools of the Aristotle University of Thessaloniki, as well. It is designed as an interdisciplinary course, in the sense that speakers (professors, instructors, researchers) from other disciplines and Schools may be invited and teach a specific subject related to their discipline, such as environmental economics and/or political economy. Usually, invited speakers come from other departments of the School of Law, such as from the Department of Sociology of Law (and teach, for instance, environmental ethics).

Best practice elaboration

"International and European Environmental Governance" focuses especially on global environmental challenges and the policies undertaken at the international and EU levels. It is divided in two major sections, the international and European environmental governance.

Under this perspective, the instructors have included an interdisciplinary approach and teach about new tools and instruments such as the nature-based solutions for environmental protection. Although it is not an autonomous course, NBS are discussed during the course, specifically analysing the role of law in providing the necessary framework for designing and implementing NBS interventions. As there are differences between the two levels of analysis (international and EU), special attention is given on understanding NBS and how existing legal frameworks can further promote or hinder NBS effectiveness.

The course is offered to small numbers of students (usually 20 to 30 students), compared to the huge numbers attending most of the other courses in the School of Law. Small groups of students have better interaction with the instructors and teamwork is further promoted.

Students have the opportunity to present in class a topic of their interest, on which they can work either alone or in groups of 2-3 persons. They may choose whatever topic they like, as long as it is related to environmental protection and governance. Interdisciplinary topics, such as NBS, are strongly encouraged by the instructors.

In addition, instructors inform about and encourage students to participate in the University's environmental groups or engage in local communities efforts on sustainable development. Environmental consciousness is promoted throughout the classes, especially with the invitation of other speakers and the analysis of current environmental challenges: i.e. the Intergovernmental Panel on Climate Change - IPCC's assessment reports, climate change negotiations, the EU's new initiative "Fit for 55", marine protection and other topics related to environmental governance are thoroughly discussed in the classroom, presenting also data and info coming from other sciences.

Pedagogical approaches

Although the course is offered in a traditional school, which does not easily incorporate modern pedagogical approaches, the instructors of the course try to include new approaches apart from traditional teaching.

The course promotes social and environmental responsibility and actually manages to create the next generation of lawyers who are aware of topics, such as NBS, and are familiarized with these new tools and the complexities of legal and policy frameworks on environmental protection. Environmental awareness and environmental citizenship are extremely important for the next generation of lawyers who are going to cooperate with scientists and policy makers to address global challenges and promote new tools and instruments. Lawyers can be at the forefront of the implementation of NBS and offer their experience and expertise in programs involving, for example, reducing emissions and applying the Paris Climate Agreement. There are many legal concerns in the development of NBS, such as local due diligence, responsibility for protected area, public procurement of NBS etc. Thus, it is of utmost importance that the next generation of environmental lawyers develop their skills and enhance their knowledge on nature advocacy.

Apart from traditional teaching in the form of lectures, collaboration and teamwork are fostered through assignments. Collaborative learning helps students understand better new concepts, such as NBS, and include these concepts in their legal professional development. In addition, as law students do not get the opportunity to work in teams in other law courses, this course promotes their collaboration skills and experience in teamwork.

Moreover, other methods of teaching, apart from lecturing, are also used in this course, such as video projections, e-forums for exchanging opinions via e-learning tools and participation in seminars. This initiative regarding teaching of NBS comes solely from the instructors, who have not received special training on NBS. Any reference to NBS comes from their own experience and research.

Challenges and opportunities

The main challenge ahead is the widespread use of NBS in Greek HEIs. For the moment, there is not a state or university policy on including NBS in the universities' curricula. Any inclusion of NBS in university courses comes from the professors/researchers' knowledge of the subject.

Having said that, there are no financial resources for including NBS in HEIs in Greece. This lack of resources is an additional obstacle in including NBS in HEIs, as is the lack of special training for instructors (professors, teaching staff etc.).

Especially for traditional schools, such as the Schools of Law, is very challenging to incorporate in their curricula new approaches and tools that could be used in forming and developing new

legal and policy frameworks. Law students are hardly included in these discussions, whereas students from other schools get more updated knowledge in these topics, such as NBS.

At the same time, that could be a great opportunity for fostering interdisciplinarity and collaboration between law students and students from other schools, as the lack of interaction of law students with other disciplines is obvious in environmental law. The law students who were interviewed for the purposes of this case study have expressed their lack of knowledge on such issues and confirmed their need to understand better NBS and learn how to include them in legal and policy frameworks.

Conclusions

NBS' incorporation to Social Economy studies may foster the green transition and deliver action-driven environmental education. Moving from theoretical aspects of SE studies to the more practical issues of NBS shall prepare students to become green citizens. HEIs in Greece could benefit from including NBS initiatives in their curricula. Even the traditional schools, such as the law schools, should be familiarized with NBS and with the concepts of eco-citizenship. Environmental awareness is built every single day and future lawyers could have an important role to play in designing, developing and implementing new legal frameworks for environmental protection.

5.3.2. Best practice from Greece (2)

NBS Best Practice in Greece: "Nisyros GeoPark Summer School"[4]

Introduction

The Nisyros GeoPark Summer School is a young initiative, completing its second year of existence in the summer of 2023. It is a joint academic effort of the Faculty of Geology and Geoenvironment of the National and Kapodistrian University of Athens and the *UNESCO* Chair *Con*-E-Ect (Conservation and Ecotourism of Riparian and Deltaic Ecosystems) of the International Hellenic University as part of the syllabus of the Intradepartmental Master's Programme "Water, Biosphere and Climate Change". This Master's has been designed to emphasize the importance of a transversal and interdisciplinary approach to biodiversity,

[4] The collected information provided in this case study were drawn from online interviews and consultations that were conducted by HUB-21 online during July 2023 with four stakeholders (2 professors, 1 sustainability expert-researcher and 1 student of the 2nd year of summer school) who participated in the summer school.

employing in the process environmentally friendly initiatives like Nature Based Solutions as case studies and to explore their educational impact/potential. The Summer School is not a mandatory part of the programme curriculum.

The postgraduate students who participate in the Summer School complete a theoretical coursework while also having fieldwork assignments, such as laboratory exercises, concerning micro-bioclimatic and measurements in the settlements of Nisyros island, dendrochronology in order to reconstruct the climate of Nisyros in the past 200 years, measurements of air quality and environmental measurements at the volcano of Nisyros. The theoretical coursework features speeches and lectures from professors and researchers of different academic and research institutes of Greece covering a wide range of academic disciplines, including Forestry and Meteorology.

The summer school takes place annually for a week at the beginning of the summer (in 2023 it was organized the week of May 28th to June 4th) and enjoys strong support from the local community and stakeholders, with the Municipality of Nisyros and the Nisyros Corporation for Public Benefit being co-organizers together with the Faculty of Geology and Geoenvironment. In a conscious effort to increase the initiative's appeal to international exchange students, all the school's activities take place in English.

Best Practice Elaboration

The Nisyros GeoPark Summer School was established as part of an effort to showcase the Nisyros' volcano and its surrounding area as possible candidates of the UNESCO Global Geoparks (UGGp) Network.

Students write their Master's thesis based on the experiences and experiments that they could conduct during their participation in the Summer School.

Students all live together in the same village on the island and the organizers have managed to provide both lodging and food for the students during their participation in the summer school. This would not have been possible without the contribution of the Municipality of Nisyros through the personal involvement of the Mayor of Nisyros and the support of the Nisyros Corporation for Public Benefit. Great was the impact of the local stakeholders including businesses that have offered their support in the past with in-kind contributions as well. The students and staff have tried to improve their relations with the local community of Nisyros, especially in the villages where most of their activities take place. Besides, taking the time to socialize with individuals and visiting most local businesses, the social agenda of the summer school was full with visits to local sights and drama or music performances.

Most of the NBS projects designed during the Summer School are focused on various areas that are directly or indirectly related to the conditions created on the island due to its volcano, such as ecological restoration and protection, human health and well-being, preservation of the natural fauna and flora as well as combating pollution and environmental degradation. Some are proposed and led by the students themselves. Those stem from their own interests, often the results of students using equipment and tools that measure parameters like temperature, humidity, air quality and others in their outdoor measuring activities. Additional examples of such projects include utilizing the local flora to create microclimates with lower temperatures and more shade in inhabited areas as well as utilizing the ocean water as a cooling agent.

NBS projects are often by-products that are based on the specific interests of the student and the experimental fieldwork they are conducting while other times they are results of engaging with the local needs and natural resources of Nisyros. A typical example of the latter is the proposed creation of a solar powered desalination facility that will cover the freshwater needs of the entire island. This example pays specific attention to a core type of nature-based solutions that is related to water security and water management. The impact of NBS-related activities and how much they are valued by the students can also be highlighted by the fact that one student has already decided to conduct their Master's thesis study on results collected and methods tested during their attendance of the summer school.

Pedagogical approach/es used

In the landscape of academia, the summer school that was integrated into the Master's programme stood out as an exemplary model. Its innovative approach was characterized by a combination of methodologies, aiming to foster both individual and collective growth among its students. The core pedagogies driving this summer school were:

- Experiential Learning: Rooted in the philosophy that experience is the best teacher, the summer school emphasized 'learning by doing.' Students were thrust into real-world scenarios relevant to their field of study, transforming themselves thus from mere spectators into active participants. By interacting directly with the subject matter, they garnered insights no traditional classroom setting could offer. This direct immersion translated to deeper comprehension and retention.
- Project-Based Learning (PBL): Supplementing experiential learning was the PBL approach. Instead of passively absorbing information, students were handed real problems that demanded solutions. This approach nurtured their analytical and problem-solving skills. Furthermore, by anchoring their learning in projects, the theoretical knowledge acquired was immediately applied in practical scenarios, reinforcing their learning and providing an avenue for creativity.

- Teamwork Activities: Recognizing the importance of collaboration in the modern world, the programme put a heavy emphasis on teamwork. Students were frequently grouped into diverse teams, ensuring a mix of skills, perspectives, and backgrounds. This approach cultivated essential soft skills like communication, conflict resolution, and collaborative problem solving. It also fostered a sense of community, enabling students to learn from one another.
- Interdisciplinary/Transversal Learning: Breaking the silos of traditional academic learning, the summer school introduced an interdisciplinary approach. This pedagogy recognized that real-world problems are not confined to one subject or discipline. Students were exposed to a multitude of disciplines, intertwining areas of study that traditionally might not interact. The presence of experts from different fields and sciences who came to give lectures and speeches or present their research projects strengthened further the interdisciplinary nature of the summer school. This broadened their horizons and equipped them with a more holistic understanding of complex subjects. The cross-pollination of ideas from various disciplines led to richer discussions and more innovative solutions.

The pedagogies adopted by the summer school were meticulously chosen to mould students into well-rounded, analytical, and innovative thinkers. By placing them at the heart of the learning experience and integrating diverse methodologies, the programme not only imparted knowledge but also cultivated skills that would stand the test of time in the ever-evolving world.

Opportunities and challenges met through course integration in HEI

The decision to integrate a summer school as part of a master's programme is both ambitious and visionary. This endeavour, while laden with challenges, is also replete with opportunities that can potentially transform the academic landscape and positively influence the local community.

Challenges:

a. Lack of State Support: The absence of state support can significantly impede the realization of the summer school. The endorsement and backing of state entities are essential to legitimize the programme and ease its assimilation into the university curriculum. Without this, the summer school may struggle to gain the necessary recognition and resources. So far, this issue has been mediated by the support of the local municipality and the individual actions of the professors responsible for the summer school
b. Financial Hurdles: Mounting a summer school requires significant funding. From securing a venue and ensuring the best resources, to paying instructors and promoting the programme, each step has a cost attached. The lack of funds can compromise the

quality of the programme or even threaten its very existence. Furthermore, lack of sustainable funding can also inhibit the school's chances to grow.

c. Growth Challenges: Expanding the programme, both in terms of participants and curriculum, can be an uphill task. There are limitations to how much the programme can accommodate, especially without the requisite financial and logistical support.

Opportunities:

a. Showcase for Researchers and Professors**:** The summer school provides a platform for academicians to highlight their research. It's an avenue for them to engage students, share insights, and also get feedback which could be invaluable to their future work.
b. Engagement with the Local Community**:** The summer school serves as a bridge between the academic community and the locals. By involving them, the university can foster a sense of ownership and collaboration. This is pivotal, especially when addressing issues such as "green" economic growth which often meets skepticism. Locals, with their deep-rooted connection to agroeconomic activities, might feel that their way of life, including fishing, is under threat. The summer school can be a conduit for meaningful dialogue.
c. Science Communication**:** One of the summer school's most significant roles is to effectively communicate science to the masses. With the rising complexity of environmental issues, there's a dire need for clear, concise, and actionable information. The Nisyros Geopark Summer School can act as a hub where knowledge is not just imparted but is also exchanged, leading to richer, more informed discussions.

In conclusion, while the challenges are tangible, the opportunities emerged by the summer school are immense. It's a venture that promises to enrich the academic culture, tighten the bond with the local community, and pave the way for sustainable practices. By focusing on clear communication and highlighting the tangible benefits, the Nisyros Geopark Summer School can indeed become an integral part of the university's master's programme.

Conclusion

The Nisyros GeoPark Summer School stands as a testament to innovation and collaboration in academia, embodying the fusion of education, research, and community engagement. This young initiative, now in its second year, has emerged as a remarkable model of educational best practices in Greece, highlighting the educational potential of NBS and promoting students to design their own projects with implications reaching beyond its immediate educational objectives.

Through a multifaceted approach, the Summer School has successfully woven together diverse pedagogical strategies to create a comprehensive learning experience. The integration of experiential learning, project-based learning, teamwork, and interdisciplinary/transversal

learning has not only enriched the students' academic journey but also equipped them with valuable life skills. This amalgamation has transformed passive learners into active participants, fostering analytical thinking, problem-solving abilities, effective communication, and collaboration – attributes crucial in today's rapidly evolving world.

One standout feature of the Summer School is its ability to bridge the gap between academia and the local community. By involving local stakeholders, including businesses and the Municipality of Nisyros, the initiative has created a symbiotic relationship that extends beyond the classroom. This connection is instrumental in dispelling skepticism and fostering understanding around crucial issues like "green" economic growth and environmental conservation. Furthermore, the Summer School's commitment to clear science communication addresses the pressing need for disseminating accurate information about complex environmental concerns.

While challenges like the absence of state support and financial constraints are evident, the opportunities presented by the Summer School are immense. It serves as a showcase for researchers and professors, amplifying their work and creating a channel for invaluable student feedback. Moreover, the initiative contributes significantly to science communication, acting as a knowledge hub for informed discussions and exchanges that transcend academic boundaries.

In conclusion, the Nisyros GeoPark Summer School not only nurtures scholarly excellence but also nurtures the symbiotic relationship between academia and the local community. By embracing a forward-thinking educational approach and leveraging its potential as a platform for research, collaboration, and knowledge dissemination, the Summer School paves the way for sustainable practices and for the promotion of environmental awareness, enriching both the academic landscape and the broader community. This visionary endeavor showcases the power of holistic education in shaping future leaders who are not only well-versed in their fields but also equipped to tackle real-world challenges with innovation and empathy for the nature and biodiversity protection.

5.4. Case Studies – best practices from Poland

5.4.1. Best practice from Poland (1)

NBS In-Depth Case Study from Poland: "The Inter-University Climate Academy" (Polish: Międzyuczelniana Akademia Klimatu, MAK)[5]

Introduction

The Inter-University Climate Academy (MAK) Postgraduate Program is a new and unique initiative in Poland aimed at educating professionals wishing to increase their knowledge of climate change and, above all, to gain practical skills with this important civilization challenge. The study was created through the cooperation of three universities (technical, economic and humanistic): Stanislaw Staszic University of Science and Technology in Krakow, the Warsaw School of Economics and the University of Wroclaw. The study was created with significant support from the banking and business sectors: Bank for Environmental Protection Foundation (BOŚ Foundation), Business for Climate Foundation and Climate Education Foundation.

Best practice elaboration

The Inter-University Climate Academy (MAK) postgraduate program covers the following topics:

- The physical basis of climate change,
- Biodiversity and its contemporary threats,
- Technical aspects of climate change adaptation and mitigation,
- Economic development and the natural environment,
- Man, society and climate change,
- International, regional and national legal aspects of climate change,
- Diploma seminar.

After the first semester, students can choose from one of three thematic tracks:

I. engineering and energy (implemented by the AGH University of Science and Technology),

II. economics-finance-economy (implemented by the Warsaw School of Economics),

III. man, society, spatial management (implemented by the University of Wrocław).

On the first of the mentioned paths, topics also covering NBS are implemented under the course: Ecological Engineering and Nature Based Solutions (NBS).

The aim of the studies is to develop practical knowledge and skills in the field of:

- causes of progressive climate change,
- impacts and challenges related to climate change,

[5] This case study was prepared by PUK based on information available on the study's official website and interviews conducted in June 2023 with three people: the study leader, the lecturer in charge of the NBS-related course, the study secretary of the study programme

- opportunities to counteract climate change,
- the impact of climate change on the natural environment and the functioning of societies, economies, local government units, organisations and enterprises,
- possibilities of adapting to climate change,
- existing and planned regulations related to climate change at the national, regional and international level.

MAK postgraduate studies prepare a team of professionals who will understand the ongoing climate change and its consequences, have knowledge, skills and competences and, therefore, will be able to undertake both counteracting initiatives and adaptive actions to climate change, and will have the opportunity to develop valuable relationships with scientific and industry experts in the field of climate change. Participants in these studies are representatives of business and administration, but also, for example, architects, as well as others who would like to expand the spectrum of their existing activities, increasing their knowledge on the impact of climate change or at least legal changes on functioning in modern economic conditions.

The issues of climate change, biodiversity, environmental protection and sustainability are on the one hand captured globally showing, for example, the effect of climate change, but on the other hand the study program refers to specific solutions, concrete actions and examples, including local ones.

The development of the study program was guided by the timeliness of legislation and the consistency of national and EU regulations, but also the attention was paid to major directives or documents that establish a framework for either the energy transition or climate change.

From the very beginning, it has been important for the implementation of these studies to involve various partners and stakeholders, especially from the business sector. The creators of these studies wanted not only the academic world but also business and practice to be represented, so from the beginning they expanded the group of business advisors for consultations. The very idea of the study itself came from the business sector. Stakeholders influenced the study program, suggesting the topics that should be included. The group of business partners creates a consulting base and is constantly being expanded. Lecturers are from different backgrounds. They are not only experienced scientists, but also representatives of business and non-governmental organisations. Involved stakeholders and partners also participate in the promotion of the studies. The idea of the study was presented at the Economic Forum in Karpacz, which is the largest meeting platform in Central and Eastern Europe, where not only the prospects for economic development, contemporary challenges and overcoming crises are discussed, but also concrete solutions and innovative ideas are presented.

Pedagogical approach/es used

Due to the cooperation of the three universities as well as recognised experts and practitioners, the study provides an opportunity to draw on knowledge and experience derived from different disciplines, while offering a unique educational program that could not be achieved if each university operated independently.

In order to ensure the highest possible quality of the curriculum, experts are hired to teach: on the one hand, academic experts who deal with the issue scientifically, on the other hand, practitioners - and in this case the process of their selection was preceded by an appropriate analysis so as to select people who have experience and would be ready to conduct classes, and also here the business representatives suggested the potential lecturers.

The study is expected to result in comprehensive, interdisciplinary knowledge, developing a broader perspective, combining a holistic view with business professionalism. This model of education will allow students to establish valuable cross-sectoral contacts or develop a common understanding of the issues discussed. Due to the fact that the study is created by three different universities, a variety of teaching methods can also be used, including practical methods through the use of laboratories at the universities' disposal. A very important component of the degree program's training is a diploma thesis of a complex and interdisciplinary nature, with an important practical aspect (project- and problem-oriented learning). A unique opportunity is the realisation of theses in interdisciplinary teams of several people, such as financiers, engineers and humanists, which allows for in-depth analysis and practical cross-sectoral communication.

Classes consist of both lectures and workshops. The studies are completed on the basis of a final thesis written by a team of three people. In the first semester of the studies, the classes are organised online through the MS Teams platform. In the second semester, they are held stationary at the university, which is the leader in a given year. For example, in the upcoming academic year 2023/2024 they are planned as follows: 1 student convention in Warsaw, 1 student convention in Wrocław, and the remaining conventions will be held in Krakow. A graduate obtains a diploma from three universities. The document itself is issued by the leading university, which means that in the upcoming academic year 2023/2024 the diploma will be signed by the rector of AGH.

Regarding NBS issues, there is a separate course in the curriculum dedicated to this issue: *Ecological Engineering and Nature-Based Solutions (NBS)*. There is a lot of focus on well-known nature-based solutions, such as green roofs, permeable pavements, retention basins, bioretention basins, generally those solutions which serve the solutions known under the term “sponge city”. Technical/engineering issues are not discussed as part of this course. More attention is given to the role of the transformation of urban spaces and the possible outcomes

resulting from such solutions. Solutions for the creation of so-called “good public spaces” are also discussed, these and the above solutions concerned the first level, i.e. solutions that are more micro in scope. There is also an effort to convey the importance of vegetation, large parks and forests, and in this area there is a big contribution from an outside expert - who is an employee of the city greenery management in Krakow. The city of Krakow is implementing many solutions in this area, such as pocket parks, retention basins, biodiversity enclaves or dry polders. During the course of the workshop, an effort is always made to start with solutions at the local level, but to move on to national and global solutions. Students' reactions to this course after its first implementation are known. In general, the reception of these classes by students was positive, especially as the city of Krakow is one that allows many practical solutions to be demonstrated. In general, such nature-based solutions receive a lot of support. On the other hand, it is difficult to assess how e.g. a person working in a bank could use such knowledge in the future, so the presented solutions could be introduced in individual buildings, e.g. bank premises.

Opportunities and challenges met through its integration in respective HEI

According to the creators of these studies, topics related to sustainable development, also nature-based solutions, have great potential when it comes to the possibility of integrating them into higher education. It is stressed that we need to build more and more conscious societies and more conscious and responsible entrepreneurs, but also those managing at the administrative level, and it is crucial that the level of responsibility for decisions, but also visions for the future take into account the environmental aspect. Education in this area should take place not only in various fields of study, including social studies, but also at each stage of education, appropriate to the role, starting with the acquisition of skills in, for example, waste segregation and consumer awareness of what they are buying, what is associated with this product, what consequences this purchase has. This is an extremely complex topic, but our responsibility and awareness is formed with development, and undoubtedly this is something that requires an extremely high level of attention and should be the subject of education.

The greatest asset of these studies is their interdisciplinarity, the ability to draw on knowledge and experience from different disciplines. In addition, a great advantage is to base these studies on close cooperation with external stakeholders, including the business sector. A hands-on approach to teaching, collaborative, experiential, practically oriented activities are also very important.

A challenge and some difficulty was the organisation of studies by three universities, which have their own rules and specificities. Some common rules had to be established - and here the most important one is the appointment of a leader for the year (each year a different university

is to be the leader). However, students appreciate that they can use the educational base of the three universities. The biggest challenges for conducting such interdisciplinary and cross-university studies are administrative challenges, that is, meeting certain imposed requirements, certain schemes, administrative procedures, which for each university are quite separate and not yet adapted to operate in a more flexible environment.

While the administrative challenges are basically obvious, the less obvious challenge was to reconcile specialists and experts from different fields. Developing a study program that would reconcile all three scientific fields in a balanced way required many meetings and consultations. However, the end result turned out to be satisfactory for everyone.

Conclusion

The presented case study of The Inter-University Climate Academy (MAK) Postgraduate Program is a unique offer of three universities in Poland, focused on the need for education in the areas of climate change, biodiversity, environmental protection and sustainability, both in the global and local context. Involving lecturers and partners from various backgrounds - both academic and practical - in this project enables the presentation of these problems from different perspectives. The study is expected to result in comprehensive, interdisciplinary knowledge, combining a holistic view with business professionalism. The involvement of three leading universities in Poland in this project enables the implementation of various teaching methods, including practical methods through the use of laboratories at the university's disposal. Studies also include NBS issues (*Ecological Engineering and Nature-Based Solutions (NBS) course*), which focus on: green roofs, permeable pavements, retention basins, bioretention basins, etc. The city of Krakow is implementing many solutions in this area (e.g. pocket parks, retention basins, biodiversity enclaves or dry polders) and allows many practical solutions to be demonstrated to the students. It means NBS solutions receive a lot of support.

To sum up, issues related to sustainable development and NBS have a great potential to implement them into HEI. Due to the introduction of such studies and courses, it is possible to educate various entities, including business ones, which should result in the popularisation of nature-based solutions both on a local and global scale.

5.4.2. Best practice from Poland (2)

NBS CASE STUDY FROM POLAND: ECOCITY (POLISH: EKOMIASTO)

Introduction

EcoCity is a unique 3-year Bachelor's degree course offered by the University of Lodz (hereafter referred to as UL). It is the only educational offer of this kind in Polish higher education. The study programme is unique in that it places urban sustainability and NBS-related issues at the centre of education. These are interdisciplinary studies by combining the study of two faculties of the UL: the Faculty of Biology and Environmental Protection and the Faculty of Economics and Sociology. This combination ensures compatibility and a wide range of knowledge transferred to the students. Another great advantage of the studies is the involvement in the educational process of experienced practitioners working locally in Lodz and the Lodz region on a daily basis in public services, non-governmental organisations or business. These practitioners are responsible for the practical part of the course – field activity, apprenticeships, and the study of selected subjects. The studies respond to the university's diagnosis of the current needs of the labour market in terms of the growing demand for urban managers, i.e. experts shaping sustainable urban development. They also provide a response to the need for active cooperation with employers in profiling courses and curricula. Hence the idea that the 'city' should be seen as a space for the concentration of natural resources, capital and the generation of income and benefits, including ecosystem services.

The modular curriculum with four dedicated manuals that attempt to describe the key categories of contemporary urban development were prepared as part of the implementation of a project co-financed by the Norway Grants - Scholarship and Training Fund. (Project "EcoCity. Education for sustainable, intelligent and participatory urban development", project number FSS/2014/HEI/W/0081/U/0026).

Best practice elaboration

The study programme was developed by UL based on the university's diagnosis of the needs of the contemporary labour market and the demand for specialists in urban management in line with sustainable development. This need was articulated by local stakeholders during the university's meetings with the course's content partners and survey research conducted with 27 urban institutions in 2015.

The study programme has been tailored to meet diagnosed specific local needs. It combines current university theoretical knowledge and practice in the form of eight thematic modules.

In the first year, students are equipped with basic knowledge (core competences) divided into modules:

- Economics and Sociology of the City;
- Urban ecology;
- Local government and urban institutions;
- Man in the City.

In the second year, students take modules to understand and grasp the links between economic, social, spatial-environmental and institutional aspects of city functioning covered in the modules:

- Adapting Cities to Climate Change;
- Urban development planning;
- Integrated city development;
- Infrastructure systems and monitoring.

In the third year of study, students deepen and integrate their knowledge and skills and acquire specialist competences in the so-called Specialist Labs:

- Integrated Urban Development (environmental profile) or
- Integrated city development (socio-economic profile).

The environmental profile is defined by subjects such as: Nature revitalisation, Biotechnologies in environmental remediation, Eco-innovation in the city or Ecohydrological remediation of aquatic ecosystems in the city.

The socio-economic profile, on the other hand, is defined by subjects such as: Entrepreneurship and investment in the city, Quality of life in the city, Modelling the development of socio-economic processes in the city.

In the above-mentioned eight modules, particular emphasis was placed on topics and issues directly related to the NBS. These topics include, for example: the city as an ecological system (ecosystem, natural balance, biodiversity, ecosystem services), the city - a place of concentration of natural resources (natural capital, green infrastructure, green areas, city parks), the city - a place of accumulation of environmental losses (pollution in the city, environmental quality in the city), the city - challenges for development (sustainable city development, human capital, creative cities, innovation, competitiveness of cities), urban revitalisation, urbanisation of cities, sources of ecological information, contemporary threats to the urban environment and their consequences, climate change, waste management, decline in biodiversity, functions of green areas and their importance for the city, sustainable transport in the city.

EcoCity is a course that assumes a significant level of practical training in the didactic process (more than 60% of ECTS credits). The programme offers an innovative, modularly integrated education model. This innovation of education consists, among other things, in:

- orientation of the educational content around urban issues - current socio-economic and environmental problems of contemporary cities and their functional areas;
- modular construction of the curriculum and study plans;
- basing the didactic process on close cooperation with practitioners involved in the "life" of the city as well as public institutions in Lodz and Lodz region;
- extensive use of blended learning techniques and modern computer software to enhance the effectiveness and efficiency of education;
- the use of interactive teaching methods to acquire knowledge and practical skills as well as social competences desired on the labour market;
- the emphasis on the role and importance of soft competences within individual subjects and specialist laboratories;
- the acquisition by the student of the ability to design a career and to move flexibly in the labour market.

Another important aspect of the program is the shaping of pro-social attitudes and skills of active participation and co-responsibility of students for the development of the city and the local community. They are the initiators of various social actions, e.g., setting up an apiary at the university, workshops for children and residents on apitherapy.

The study programme assumes a large number of active classes and the participation partners including experts and external consultants in the field of EcoCity, i.e. practitioners from public institutions, the business sector and non-governmental organisations. These include, but are not limited to, the City of Łódź Office, the Landscape Parks Complex of the Łódź Voivodeship, the Marshal's Office of the City of Łódź, the Municipal Urban Planning Laboratory, the Łódź Special Economic Zone, the Łódź Regional Development Agency. Students are required to complete a 3-month work placement to gain practical skills and social competences of a professional nature.

The aim of the studies is to prepare urban managers who will understand the socio-economic changes taking place in order to shape sustainable, intelligent and participatory urban development. The education on the course provides opportunities to acquire practical knowledge and skills by embedding the education process in the realities of urban life (local government institutions, business and non-governmental organisations). Graduates with the EcoCity major possess a versatile skill set that opens numerous employment opportunities in various institutions and sectors such as municipal and territorial self-government institutions,

inspection authorities and environmental protection offices, environmental protection services, spatial planning offices, and mass media.

Pedagogical approach/es used

Thanks to the combination of studies in two faculties of the university and the teaching of practical classes (accounting for almost 60% of ECTS credits) by representatives of local authorities, business and NGOs, the course programme presents modules on 'the city' in a multifaceted and multidimensional way. Practitioners include specialists in strategic management, environmental protection, marketing and promotion, political scientists, sociologists, etc. Also present are representatives of the so-called sectoral view of the city (architects and urban planners, specialists in public finance, environmental protection, urban greenery management, water resources, etc.).

This selection of staff makes it possible to present different perspectives on the scientific issues involved. This combination of up-to-date university knowledge and practice also allows the teaching content to be adapted to the current needs of the labour market and is an advantage of a degree course that trains future specialists for a specific demand.

The study programme places great emphasis on students' independent work (without the teacher, but under his/her supervision), preparing them to conduct scientific research and combining it with practical knowledge. During the studies, emphasis is placed on:

- motivating students to acquire knowledge,
- facilitating the memorisation of knowledge,
- developing practical skills (ability to use knowledge),
- creating conditions for learning about current economic realities and the urban ecosystem (learning about the future working environment of graduates),
- stimulating continuous development and developing the habit of learning.

The course incorporates various teaching methods such as lectures, auditorium exercises, laboratory exercises, field activities, lectures, diploma seminars for presenting their thesis and professional practice. By incorporating these diverse teaching methods, the course aims to enhance students' understanding of the issues and preparing them for successful careers.

A variety of didactic methods are used in the training process, encompassing both traditional and modern methods. These methods include interactive elements which are designed to engage and activate students in their learning journey. Among the methods used to activate students, the following are considered to be the most important ones:

- heuristic methods, including "brainstorming" - implemented in small groups, in elective classes;
- mind mapping methods, including above all: mental maps, cognitive maps, thought maps - implemented in small groups, during elective classes;
- project methods - independent and active work of students, also with the use of appropriate computer software, most often involving the development of a practical project;
- discussions/debates including guided discussions/debates (e.g., Oxford debate - methods implemented most often in seminars and conversation classes;
- strategic analyses including e.g., SWOT analysis, SOFT, matrix methods, as methods of team analysis and evaluation of a particular problem or used as methods facilitating decision-making and strategic choices;
- didactic games (including simulation and decision-making games), the idea and character of which require the student to be creative and to look at the topic/problem out of the box.

Classes may be conducted using MS Teams platform, Moodle platform, MS Office tools and electronic library databases, depending on the preference of the lecturer.

The study is intended to result in the acquisition of comprehensive, interdisciplinary knowledge and preparation for urban management in line with the idea of sustainable development, green economy and environmental protection. In addition, the aim of this educational program is to acquire knowledge through contact with practice in the implementation of socio-economic objectives and management of the natural potential of urban ecosystems. Such profile of studies translates into high competences of graduates and building awareness and sensitivity to urban issues in Poland, which can be developed by master's studies in, among others, the fields of spatial management and environmental protection.

With regards to NBS issues, there are thematic blocks dedicated to these issues in the study programme. This was discussed in an earlier section. Among the issues discussed are topical topics such as: urban adaptation strategies to climate change or sustainable transport. It should be emphasised that EcoCity is also about action on the local ground. At the Faculty of Economics and Sociology, the first apiary at the UL has been set up and is looked after by an EcoCity student. In addition, apitherapy classes and workshops for primary school pupils and willing residents of the city of Łódź are also conducted. EcoCity lecturers are involved in various projects - e.g., the City of Accessible - workshops on the accessibility of public spaces, or lectures in secondary schools entitled 'Cities and Climate Change'.

Opportunities and challenges met through its integration in respective HEI

This major was designed as a response to the challenges and changes taking place in Polish society and thus directly in the environment of the UL. These changes include demographic,

economic, technological, environmental and civilisational ones. All of them translate into the necessity of modern urban design in line with the NBS. The course is also seen as an opportunity for the university itself to strengthen its competitiveness in the Polish education market. Currently, it is the only NBS offering of its kind on the Polish educational market.

The major responds to the needs of the labour market and the demand for specialists in modern urban management in line with the idea of sustainable urban development and shared responsibility for the environment. In the 21st century, European cities are facing many challenges and problems, such as air pollution, light and noise pollution, overuse of concrete in a public space and eliminating greenery. Cities are also challenged to ensure equal access to environmental services (water, energy, green spaces) and energy security, and to initiate climate change adaptation measures.

An opportunity for this field of study and its integration into the NBS is the social change currently taking place in terms of approaches to urban management. There is an ongoing discussion in the European Union and Poland about the necessity to consider urban policy as one of the key public policies. Hence, in the near future, there will be an increased demand for professionals in the public sector (municipal governments) and the private sector (consulting firms, environmental or real estate companies) and in non-governmental organisations. This is a major opportunity for the higher education system.

An important advantage of the major is that the educational programme is conducted in such a way as to eliminate and solve contemporary problems of the city, efficiently directing its development so that it is a better place to live for all its inhabitants. In this course, ecology and economics have been combined because, from the point of view of the university staff, these two perspectives need not be at all mutually exclusive, but can complement each other. Thus, knowledge from the social sciences, environmental sciences, economics and urban planning have been combined, which ensures that these studies are multifaceted and innovative. This course also has the advantage of a hands-on approach to teaching and the involvement of partners, experts and external consultants to ensure joint practical learning activities.

One of the important challenges of the program's founders was to develop a study plan and dedicated, four original manuals incorporating two diverse disciplines. They are now freely available and free of charge: ECOMIASTO#Economy Sustainable, intelligent and participatory urban development, ECOMIASTO#Environment Sustainable, intelligent and participatory urban development, ECOMIASTO#SOCIETY Sustainable, intelligent and participatory urban development, ECOMIASTO#GOVERNANCE Sustainable, intelligent and participatory urban development.

Conclusion

The presented EcoCity course is unique in the perspective of the Polish higher education offer. It is an example of a university's approach to changes in the labour market and the growing demand for professionals educated to manage cities according to sustainable and green development. The program places particular emphasis on the interdisciplinarity of knowledge, the inclusion of NBS-related issues in the curriculum and the practical application of university knowledge with practice provided by local stakeholders.

Note: The case study was compiled from interviews with four UŁ staff members, based on information on the UŁ website and general public materials.

5.5. Case Study - best practices from Portugal

5.5.1. Best practices from Portugal (1)

NOVA University- MSc in Law and Economics of the Sea - Ocean Governance (MDEM) and Ocean School

Introduction

The Master's in Law and Economics of the Sea-Ocean Governance (MDEM) and the upcoming OceanSchool program are interdisciplinary initiatives offered by NOVA University, placing a strong emphasis on integrating nature-based solutions (NBS) and the social economy to address environmental challenges and promote sustainable practices in ocean governance.

The MDEM program is a comprehensive interdisciplinary course jointly offered by the NOVA School of Law and the NOVA School of Business and Economics (NOVA SBE). Coordinated by renowned expert Assunção Cristas, it has garnered international recognition as a best practice in Maritime Management, since it was ranked best in the world, according to Eduniversal‘s international ranking in Maritime Management.

The Master's program provides specialized training in sea-related matters through a multidisciplinary and integrated approach committed to sustainable development. It offers a Post-Graduate Certificate (1st phase) while creating pathways for students to continue their studies and achieve a Master's degree in Law and Economics of the Sea (2nd phase).

The program welcomes applicants from diverse academic backgrounds, including Law, Economics, Management, Finance, Social and Political Sciences, International Relations,

Geography, Marine Biology, and Engineering. The syllabus fosters holistic approaches to maritime studies, equipping students with new tools for improved ocean governance.

The OceanSchool program, scheduled to launch next year, will be a groundbreaking initiative aimed at providing a comprehensive and interdisciplinary education in ocean studies for bachelor students. It will be a pioneering effort to bridge the existing gap in education programs in economics related to blue growth, fostering the development of human capital crucial for a sustainable blue economy. The OceanSchool is envisioned to become a leading educational platform in ocean studies, equipping students with knowledge, skills, and competencies to address complex ocean governance challenges and opportunities.

Best practice elaboration

MDEM program

The MDEM program was initiated by the NOVA School of Law in 2015 and has recently evolved to include the NOVA School of Business and Economics, creating a comprehensive and interdisciplinary curriculum focused on marine governance. Integrating expertise and resources from both institutions enhance the program's effectiveness and impact. One of the program's key strengths is its ability to bridge the gap between law and economics, providing students with a deep understanding of ocean governance's legal, economic, and environmental aspects.

The program's success and international recognition can be attributed to its commitment to sustainable development and its capacity to address the complex challenges and opportunities in ocean governance. It emphasizes nature-based solutions (NBS) and integrates specialized courses, field visits, and collaborative projects covering ecosystem restoration and conservation, sustainable fisheries and aquaculture, and coastal protection.

Though "nature-based solutions" term was adopted only recently, related concepts are covered in courses like Sustainable Blue Economy Financing, Policy Integration and Development, Policies of the Sea, and Economic Models for a Sustainable Sea Economy. While the specific term "nature-based solutions" may not have been used extensively, the importance of ecosystems and ecosystem services is emphasized throughout the curriculum. Several courses touched on marine special planning, addressing the maritime spatial planning directive.

The program consistently addressed sustainability throughout its various units. The course on natural resources, led by Prof. Oliveira e Carmo, who previously directed the General Directorate of Maritime Policies in Portugal, emphasized the significance of sustainable resource management. Sustainability is also explored in the context of the Law of the Sea Convention in one of the units. Practical assignments with oral presentations in the course on European Maritime Law allowed students to delve into sustainability-related topics. Overall,

sustainability was at the MDEM program's core, directly and indirectly connecting various aspects of the maritime industry.

Ocean School

The OceanSchool program will adopt best practices to ensure a dynamic and engaging learning experience. The curriculum is designed to endow students with the necessary competence and skills to conduct economic and public policy analysis on maritime themes, producing the first specialized breed of economists and practitioners in Blue Growth in Portugal. The program will integrate the expertise of faculties from NovaSBE and NHH, providing students with a holistic understanding of ocean-related issues. Additionally, it will include place-based learning, problem-based learning, action competence learning, and participatory action research to enrich the students' educational journey, fostering practical applications and real-world problem-solving.

Pedagogical approach/es used

MDEM program

The MDEM program employs a diverse range of pedagogical approaches to enrich the learning experience of students. Lectures form the foundation for acquiring theoretical knowledge, while seminars facilitate interactive discussions and foster critical thinking. Real-world case studies enable students to analyze complex marine governance issues and propose practical solutions. Collaborative group projects encourage teamwork and the application of acquired concepts, enhancing students' problem-solving skills.

Furthermore, the program provides valuable opportunities for practical learning through internships, field visits, and guest lectures by industry experts. These experiences connect students with real-world practices in ocean governance, allowing them to gain hands-on insights into the field. Emphasizing practical learning ensures that graduates are equipped with the necessary skills to address real-world challenges in ocean governance.

The classes are primarily delivered using the expository method, but the professors actively encourage student participation and interaction. In most disciplines, assessment includes oral presentations and written assignments. Professors encourage students to engage in constructive criticism and pose questions during oral presentations. This interactive approach benefits both the presenter, who can improve their written work based on feedback, and the peers, who get to reflect on different themes. This interaction leads to a mutual increase in knowledge.

Most of the professors in this program possess in-depth knowledge of the subjects they teach, owing to their professional experiences. This practical expertise allows them to adopt a less conservative academic approach, enhancing the quality of education. Notably, guest speakers from the private and public sectors, such as a company from the aquaculture industry or a candidate for a municipal position, have contributed to the program, enriching the learning experience.

All the professors demonstrated their expertise in green transition and sustainable development topics. These areas were addressed within the context of ocean governance and sustainable blue economy in various disciplines, such as Financing Sustainable Blue Economy, Policy Integration and Development, Policies of the Sea, Marine Natural Resources and Economics, Ocean Governance, and Environmental Law. The fact that many faculty members are active professionals in their respective fields further enhances the program's appeal, as they bring practical insights to the subjects they teach.

During the curriculum phase of the program, students exhibited strong knowledge and sensitivity to environmental sustainability issues, particularly concerning the marine domain. The knowledge acquired during the classes heightened students' awareness of environmental sustainability in the ocean context, even among individuals who did not work directly in the field but had prior knowledge of sustainability-related topics.

The program's comprehensiveness is deemed sufficient to provide future professionals with a holistic understanding of sustainable ocean governance, including the contributions of nature-based solutions. The program's robustness ensures that students, regardless of their educational backgrounds, gain a comprehensive vision of sustainable ocean governance and the potential of nature-based solutions for promoting this development.

3.2. Ocean School

The OceanSchool program is expected to utilise various innovative pedagogical approaches to deliver a dynamic and engaging learning experience. These may include place-based learning, problem-based learning, action competence learning, and participatory action research. By combining theoretical knowledge with practical experiences, students will develop a deep understanding of ocean-related issues and be empowered to apply their knowledge to real-world challenges.

Place-Based Learning: The program will utilize the unique geographical locations of NovaSBE and NHH to immerse students in the ocean environment and its challenges, allowing for hands-on experiences and a deeper understanding of local marine issues.

Problem-Based Learning: Students will engage in solving real-world ocean governance problems, collaborating with experienced researchers and practitioners from recognized non-academic institutions like IPMA. This approach will foster critical thinking and practical skills.

Action Competence Learning: The program will empower students to actively participate in finding solutions to complex ocean-related challenges, instilling a sense of responsibility and agency in shaping a sustainable future.

Participatory Action Research: Students will be involved in research projects, providing them with valuable research skills and encouraging collaboration with stakeholders for meaningful impact.

Opportunities and challenges met through its integration in respective HEI

MDEM program

Integrating the MDEM program within the NOVA School of Law and the NOVA School of Business and Economics creates numerous opportunities for collaboration, knowledge exchange, and interdisciplinary learning. The diverse expertise of faculty members from both institutions enriches the program, allowing students to gain insights from multiple perspectives, including legal, economic, and social aspects of ocean governance. This integration enhances the program's academic excellence, offering students a comprehensive and well-rounded education.

The interdisciplinary nature of the MDEM program prepares students for careers that address not only environmental challenges but also social aspects of ocean governance, making them well-equipped to implement nature-based solutions (NBS) and contribute to the social economy. The program attracts high-caliber students with varied educational backgrounds, fostering cross-disciplinary discussions and encouraging a holistic approach to addressing marine governance challenges.

The program's international focus and instruction in English attract a diverse student body, facilitating cultural exchange and expanding global networking opportunities. Students from different countries, including Portugal, Sri Lanka, Brazil, Cape Verde, Angola, other Portuguese-speaking African countries (PALOP), Germany, and the Nordic countries, create a dynamic and inclusive learning environment. This diversity enriches discussions and fosters a broader understanding of marine governance challenges on a global scale.

Regarding partnerships, the program primarily engages in institutional collaborations with professors from the NOVA School of Law, NOVA School of Social and Human Sciences, Lusófona University, and the NOVA SBE. The program also offers support through awards and scholarships to recognize and incentivize academic excellence.

The trimester structure of the program, with 10 to 12 classes, offers opportunities for focused and intensive learning. However, it challenges faculty members to deliver up-to-date content and ensure students receive the latest knowledge in the rapidly evolving field of ocean governance. Faculty must stay updated with emerging trends and developments to provide students with relevant, cutting-edge insights.

While integrating the MDEM program within the respective HEIs opens doors to significant opportunities, effective communication, collaboration, and adaptability are essential to address the challenges and ensure the program's continued success in promoting sustainable ocean governance.

Ocean School

The OceanSchool program's future implementation presents ample opportunities for collaboration, research, and knowledge exchange. By integrating faculties like the NOVA School of Law, Nova School of Business and Economics, NOVA School of Social and Human Sciences, and NOVA School of Science and Technology, the program will foster interdisciplinary collaboration, allowing students to benefit from the expertise of faculty members across various disciplines. Its focus on sustainability and blue growth also aligns with global trends, opening doors for partnerships with governmental organizations, NGOs, and industry stakeholders. Furthermore, its international outlook is expected to attract students from diverse backgrounds, facilitating cultural exchange and global networking opportunities.

However, the program may face certain challenges that require careful consideration. Coordinating faculty members from different disciplines and ensuring effective communication will necessitate meticulous planning and ongoing coordination. Developing an integrated curriculum that incorporates diverse perspectives may pose challenges that need to be addressed. Additionally, attracting high-caliber students and establishing strong connections with relevant stakeholders in the ocean governance field will be essential for the program's success, demanding proactive and collaborative efforts from the coordinators and faculty members.

Conclusion

The Master's in Law and Economics of the Sea-Ocean Governance (MDEM) and the upcoming OceanSchool program exemplify NOVA University's commitment to promoting sustainable practices and addressing environmental challenges in ocean governance. These interdisciplinary initiatives integrate nature-based solutions (NBS) and the social economy, offering students a comprehensive understanding of the legal, economic, and environmental aspects of ocean governance. With a focus on practical learning and collaboration, these programs equip students with the necessary skills to tackle real-world issues and foster a global

perspective. The MDEM program, a best practice in maritime management, combines law and economics within NOVA School of Law and Nova School of Business and Economics, creating a dynamic and inclusive learning environment for students from diverse educational backgrounds. Together, these initiatives contribute to advancing a more sustainable and inclusive future for the benefit of ecosystems and communities worldwide.

MDEM program

The Master's in Law and Economics of the Sea-Ocean Governance (MDEM) offered by NOVA University represents a best practice in interdisciplinary marine governance education. By combining law and economics and integrating nature-based solutions (NBS) and the social economy, the program equips students with a holistic understanding of sustainable ocean governance. The emphasis on practical learning, international focus, and collaboration fosters a dynamic and inclusive learning environment, preparing students to tackle real-world challenges in the field. As the MDEM continues to evolve and overcome integration challenges, it remains a driving force in promoting sustainable practices and effective ocean governance, contributing to a more sustainable and inclusive future for our oceans and communities

Ocean School

The OceanSchool program holds great promise as a pioneering initiative in ocean studies. By adopting innovative pedagogical approaches, fostering interdisciplinary collaboration, and integrating multiple faculties, the program will equip students with the knowledge and skills needed to address pressing ocean governance issues. While challenges may arise during implementation, a commitment to collaboration, engagement with stakeholders, and proactive planning will ensure the program's success. Ultimately, the OceanSchool program will play a vital role in shaping a sustainable and prosperous future for our oceans and in developing future leaders in the field of Blue Growth.

Note: This case study is based on information available on the study's official website and interviews conducted in June 2023 with two people (1 professor and 2 students).

5.5.2. Best practices from Portugal (2)

Faculty of Sciences of University of Lisbon- HortaFCUL, Permalab, Bioislandss and FCULresta

Introduction

The HortaFCUL project was initiated by a group of students at the Faculty of Sciences, University of Lisbon (FCUL), in 2009. Driven by their interest in permaculture and its potential to address

ecological, social, and economic challenges, the project gained support from FCUL and dedicated volunteers. HortaFCUL is an edible garden near their C2 building, blending agriculture and landscaping with horticulture, herbs, and fruit trees. This space, considered the heart of the project, aims to raise awareness and demonstrate more eco-friendly practices based on the ethics, principles, strategies, techniques, and tools proposed by permaculture and Nature-Based solutions (NBS). Permaculture is a sustainable design system inspired by nature, aiming to create self-sustaining and regenerative human habitats that work in harmony with the environment Permaculture and NBS are linked by their shared focus on sustainable practices, ecosystem design, and working with nature. Both aim to create resilient systems that benefit the environment and communities.

The HortaFCUL project served as a platform for initiatives that have blossomed over time, such as Permalab, FCULresta, and Bioislands. In recent years, the faculty has become more actively involved, resulting in the establishment of the Living Laboratory for Sustainability@Ciências ULisboa in 2015. This laboratory promotes sustainable development, engaging the Ciências community in various activities. Its projects span different aspects of sustainability, including ecological coverage, natural ventilation, biodiversity promotion, energy efficiency, and volunteering. The initiatives align with key Sustainable Development Goals, such as Quality Education (SDG 4), Sustainable Cities and Communities (SDG 11), Climate Action (SDG 13), and Life on Land (SDG 15), emphasising the well-being of people, the planet, and prosperity.

The Living Laboratory of Permaculture initiated through collaboration with the research centre called “Centre for Ecology, Evolution and Environmental Changes” (cE3c), emerged from the HortaFCUL project. It operates within a designated campus space and serves as an open ecosystem for innovation. The PermaLab facilitates the development of innovative and systemic projects proposed by permaculture, incorporating research and innovation processes in a transdisciplinary, transformative environment. By mimicking ecological patterns and relationships, permaculture-based solutions are scientifically evaluated, generating evidence to support the regeneration of the university campus and fostering collaboration between public, private, and personal partnerships.

Among these initiatives, FCULresta is a dense, biodiverse, multifunctional mini-forest in the urban centre. It is a practical example of a transdisciplinary approach, mobilising society towards climate action, promoting urban biodiversity, and contributing to other Sustainable Development Goals at the Faculty of Sciences. FCULresta benefits from institutional support and integrates a vital scientific component to deepen understanding of the role of naturalised spaces in an urban context. Through the transformation of an old lawn into a mini-forest with abundant plant life, FCULresta showcases ecological principles in action, with the active participation of volunteers from Sciences and other educational institutions who planted over

600 plants, installed insect hotels, shelters for amphibians and reptiles, and soil monitoring sensors.

Bioislands is a collaborative project between HortaFCUL, ADPM, and the research partners of the LIFE Desert Adapt project. It aims to convert 500 square meters of lawn on the Faculty of Sciences of the University of Lisbon (FCUL) campus into biodiverse woodlots or "Bioislands."

Best practice elaboration

HortaFCUL

HortaFCUL is an exemplary model for bottom-up NBS initiatives within an Higher Education Institution (HEI) setting. Its key achievements include the establishment of the PermaLab and FCULresta and the innovative implementation of a solar garden. By converting a 500-square-meter lawn into a mini-forest, HortaFCUL showcases sustainable land management practices.

The project, HortaFCUL, operates horizontally using Sociocracy as its governance framework. Sociocracy is a system similar to democracy or corporate governance, best suited for organizations valuing equality and self-governance. It is also known as Dynamic Self-Governance or Dynamic Governance. The project is led by five guardians who collectively care for HortaFCUL and coordinate its various projects, encouraging shared responsibility among stakeholders. HortaFCUL has successfully shown scalability by involving diverse groups, such as students, faculty, and external participants

Permalab

The project aims to promote permaculture both within and outside the academic community. One of its primary goals is to generate knowledge about permaculture, emphasising practical applications and multi-functional spaces. PermaLab strives to create a diverse ecosystem where various stakeholders collaborate on innovative projects based on ecological principles.

The project's achievements over its six-year tenure include converting 2,500 to 3,000 square meters of land, which have been transformed into permaculture-inspired spaces. PermaLab has organised numerous open days and workshops of varying sizes and participated in events such as the "Festival do Regador", which featured discussions on urban agriculture. The initiative has significantly impacted the university, fostering institutional and financial support, which was

only sometimes the case. Previously, there were concerns and opposition to it, but now there is a sense of collaboration and recognition of the project's value.

FCULresta

The FCULresta project is based on the Miyawaki method, a proven technique for creating mini-forests with high ecological impact and low footprint. By following this method, FCULresta aims to achieve rapid growth, carbon absorption, improved biodiversity, rainwater processing, air quality enhancement, noise reduction, and local thermal comfort. Implementing the Miyawaki method showcases best practices in sustainable urban planning, climate action, and promoting ecosystem services within an urban environment.

Bioislands

The Bioislands project at FCUL showcases several best practices in sustainability and environmental education. The project promotes biodiversity conservation and landscape adaptation to climate change by transforming traditional green spaces into biodiverse woodlots. It serves as a model for other educational institutions looking to create multifunctional outdoor spaces that enhance the quality of life for the community.

The project's best practices include collaboration between academia (FCUL) and practical application (HortaFCUL and ADPM), facilitating knowledge sharing and ensuring the project's credibility. The involvement of the LIFE Desert Adapt project as a research partner further strengthens the scientific foundation of the Bioislands initiative.

Pedagogical approach/es used

HortaFCUL

HortaFCUL is an initiative that promotes a "learning by doing" approach and a culture of taking risks without fear. The project encourages participants to leave traditional classroom settings and engage in collaborative and experiential activities. It provides spaces for experimentation and learning. It follows a science-based education approach and integrates proposals from permaculture, relying on scientific evidence. The project has been the subject of several master's and doctoral thesis.

At a personal level, HortaFCUL offers various courses and workshops to take participants out of the traditional classroom setting. It fosters a collaborative and participatory environment, creating spaces for interaction using multi-functional spaces.

Workshops, courses, and open events are designed to facilitate knowledge exchange and practical learning experiences. Incorporating informal education and participatory approaches, HortaFCUL fosters critical thinking and empowers participants to reach their conclusions. This

approach has increased engagement, motivation, and knowledge retention among participants.

HortaFCUL operates in a manner that is less formal than academia but more scientific than workshops outside the scientific community. It welcomes anyone with practical knowledge, even if they are not a doctor or professor, to facilitate workshops. For instance, an agroforestry project was implemented using the syntropic agriculture method, which has only recently gained some scientific evidence.

Permalab

PermaLab adopts a hands-on approach to learning and engages participants actively. Visitors are encouraged to participate by working in the garden, promoting a practical understanding of permaculture principles. Credibility is essential, and knowledgeable facilitators conduct workshops. The activities follow a structured plan, starting with introductions, explaining the day's tasks, and ending with a review of what was accomplished. The project operates non-hierarchically, with facilitators rather than moderators, promoting a collaborative environment.

FCULresta

FCULresta serves as a living laboratory for sustainability, providing valuable pedagogical opportunities for the FCUL community and beyond. The project integrates various scientific disciplines, engaging students, researchers, and faculty members in interdisciplinary research. By involving students in the different phases of FCULresta, including planting, monitoring, and research activities, the project promotes experiential learning, fosters environmental awareness, and nurtures a sense of responsibility toward climate action and biodiversity conservation.

FCULresta adopts a multifaceted pedagogical approach that combines theoretical and practical elements to engage participants in sustainable learning. Workshops are central to educating and empowering individuals, providing them with the knowledge and skills to create mini-forests in various settings. The workshops include theoretical sessions in outdoor spaces, allowing participants to connect with nature while discussing ideas. Practical activities like seed planting and data collection promote hands-on learning experiences. FCULresta also encourages visits and collaborations with educational institutions, fostering a collaborative learning environment.

Bioislands

The pedagogical approach of the Bioislands project revolves around experiential learning and active student participation. Through workshops and practical activities, participants learn about the importance of biodiverse woodlots for climate change adaptation and community well-being. They gain hands-on experience in plantation techniques and tools, enabling them to contribute to creating Bioislands.

The project also fosters a multidisciplinary approach, combining ecological knowledge with practical skills. Students from various disciplines collaborate with horticulture, environmental science, and community engagement experts to create a holistic learning experience.

Opportunities and challenges met through its integration in respective HEI

HortaFCUL

HortaFCUL has created valuable opportunities for students to participate in NBS initiatives actively. However, particular challenges need to be addressed. Specifically, additional energy and manpower are required to monitor the social aspects of the project effectively. The limited workforce primarily focuses on doing the necessary work, leaving fewer resources available for social monitoring. Despite these challenges, the project has positively impacted students' attitudes and behaviours toward sustainability.

HortaFCUL has successfully engaged various student groups, with approximately 20 to 30 participants attending open days, indicating a growing interest and involvement. Methodologies such as Dragon Dreaming, which guides participants through the stages of dreaming, planning, doing, and celebrating, have significantly fostered a sense of community and celebration. These methodologies invite participants to sow seeds, engage in activities, and share their accomplishments' joy. With this methodology, feedback circles have proven valuable platforms for participants to share their experiences, leading to positive outcomes and continuous improvement.

The project has also provided a supportive environment for students facing psychological challenges, filling a gap left by the psychology department. Over time, the university community and faculty have shown increasing support for HortaFCUL's initiatives, accepting most of the project's suggestions. However, precise coordination and responsibility, such as having a dedicated project coordinator, are crucial from the management's perspective.

HortaFCUL operates on a limited budget but has adopted a resourceful approach. The project receives support for materials. The university's in-kind support, including waived rent, water, and electricity expenses, helps alleviate operational costs and enhances resource efficiency.

The project embraces circular practices by implementing composting methods for food waste and upcycling university waste. By closing the loop on organic waste and creatively repurposing materials, HortaFCUL contributes to waste reduction and promotes sustainable practices, especially NBS.

Permalab

PermaLab provides opportunities to address local climate change, biodiversity, environmental protection, and sustainability issues. The project showcases how these global concerns can be effectively addressed locally by demonstrating the practical implementation of permaculture principles, as a form of NBS. The involvement of various stakeholders in educational practices fosters cooperation and the creation of networks, expanding the project's impact.

However, there are challenges to consider. Based on permaculture concepts, the project's spiral approach faces constraints due to time limitations. While there is ample dreaming and planning, more time for implementation and reflection is often needed. While the project does not heavily rely on academic participation, it still provides valuable practical learning experiences for students and engages them in permaculture principles. The project's success and positive impact on the university community demonstrate that academic involvement is optional for achieving meaningful outcomes in sustainability initiatives like PermaLab.

FCULresta

Integrating FCULresta into the HEI and the wider community has brought significant opportunities. The project has gained widespread interest and support from various stakeholders, leading to collaborations with schools, NGOs, and local authorities. The involvement of partners and entities has facilitated the dissemination of knowledge and resources, boosting the project's visibility. FCULresta has inspired the creation of similar initiatives, generating opportunities for knowledge exchange and further expanding the scope of urban mini-forests.

However, FCULresta has also faced particular challenges. The COVID-19 pandemic has posed significant obstacles, leading to delays in project implementation and requiring adaptations to ensure the safety of participants. Maintaining and managing the growing interest and engagement has been a critical consideration as a relatively new project. Ensuring the long-term resilience of the mini-forest and sustaining community involvement requires ongoing efforts. Although obtained through local contributions and crowdfunding, financial support remains essential for project continuity and expansion. Additionally, engaging the wider community and addressing social aspects are ongoing challenges that FCULresta aims to tackle through collaborative partnerships and shared decision-making processes.

Bioislands

Integrating the Bioislands project in FCUL provides several opportunities for the university and its students. Firstly, it strengthens the connection between academia and practical sustainability initiatives, allowing students to apply their theoretical knowledge to real-world projects. This collaboration enhances their professional development and nurtures a sense of responsibility towards environmental stewardship.

Furthermore, creating outdoor classrooms and informal learning spaces within the Bioislands opens up new educational opportunities. Students can experience nature firsthand, connect with their surroundings, and deepen their understanding of ecological systems. The project also presents opportunities for research and monitoring, contributing to the body of knowledge on biodiversity conservation and landscape adaptation.

However, integrating the Bioislands project also poses challenges. Although FCUL has been supportive, securing funding for the project requires continuous effort and resource mobilisation. Ensuring the long-term maintenance and sustainability of Bioislands requires ongoing commitment from all stakeholders involved.

Short conclusion

HortaFCUL

HortaFCUL has successfully transformed the campus of the Faculty of Sciences into a biodiverse and sustainable space, using NBS solutions. Despite limited budgets, the project maximises support from the faculty and leverages resources effectively. It has influenced student attitudes towards environmental sustainability and gained credibility from the community and the institution. HortaFCUL serves as a scalable model for integrating sustainability into higher education and inspires the replication of similar initiatives. It is a beacon of environmental responsibility, empowering individuals to create greener and more resilient campuses and communities.

Permalab

PermaLab's Living Laboratory of Permaculture has proven to be an exemplary initiative that promotes permaculture principles within and outside the academic realm. By focusing on practical applications, multi-functional spaces, and engaging stakeholders, PermaLab has successfully generated knowledge and demonstrated the local relevance of permaculture in addressing global challenges. The project's pedagogical approach, centred on hands-on learning and collaboration, has contributed to student engagement and well-being. While there

are opportunities for further integration into the curriculum and research on pedagogical practices, PermaLab is a scalable model for other institutions looking to implement similar initiatives.

FCULresta

FCULresta exemplifies a best practice in NBS education by demonstrating the potential of urban mini-forests as transformative tools for climate action and urban biodiversity promotion. Through its pedagogical approach and collaborative efforts, the project engages diverse stakeholders, fosters knowledge exchange, and empowers individuals to take action. FCULresta inspires similar initiatives and highlights the importance of transdisciplinary approaches in addressing sustainability challenges. By overcoming challenges and seizing opportunities, FCULresta has become a particular project within the university and has garnered significant interest from external entities, positively impacting the academic community and broader society.

Bioislands

The Bioislands project at FCUL exemplifies a successful collaboration between academia, community organisations, and students. The project promotes sustainability, enhances ecological value, and provides valuable outdoor learning spaces by transforming traditional green spaces into biodiverse woodlots.

Through its pedagogical approaches, the project engages students in experiential learning and fosters a multidisciplinary approach. Integrating the Bioislands project in FCUL presents numerous opportunities for students, such as professional development, research prospects, and hands-on engagement with environmental issues.

Despite funding and long-term sustainability challenges, the Bioislands project at FCUL is a best-practice example for other higher education institutions seeking to integrate environmental education and practical sustainability initiatives. It demonstrates the potential of such projects to positively impact campus communities and contribute to a more sustainable future.

Note: This case study is based on information on the study's official website, a sustainability report from FCUL and interviews conducted in June 2023 with four people (the guardians of HortaFCUL).

CONCLUSION

This study provides a comprehensive overview of the emerging field of NBS in HEIs, with a specific focus on practices that can be implemented within SE departments. A crucial aspect of this comprehensive study involves combining latest developments through best practices in NBS education and eco-citizenship, providing a broader understanding on how these concepts intertwine. It offers internationally comparative insights into the ways in which HEIs in project partner countries, especially their SE departments, effectively integrate active learning in environmental sustainability and NBS into their settings. Thus, this study addresses the needs of HEIs' educators and education researchers who seek to understand the use and educational value of NBS as a more effective alternative to traditional forms of environmental education. It lays a solid foundation for advancing NBS integration in SE-related HEIs, aligning with its primary goal of developing new knowledge to embed sustainability education, particularly NBS, across the project partner countries. Additionally, it points out to the educational value of eco-citizenship in HEIs for acquiring skills needed for reaching sustainable development goals.

This study supports designing NBS-oriented educational programs through offering an overview of different best practices across project partner countries, pedagogical approaches that can be used, opportunities and challenges that educators can expect to meet. It is especially valuable given the growing interest in NBS, which is relatively new concept with diverse implementation levels in HEIs across countries. Lack of such insights in the literature will be addressed through findings of this study. This study contributes to designing innovative NBS-oriented educational programs within SE HEIs, supporting their systemic integration into current curricula and addressing the needs of educators and researchers in adopting NBS as a more effective alternative to traditional environmental education.

Nature-based solutions in HEIs

The analysis of the implementation of Nature-Based Solutions (NBS) in Higher Education Institutions (HEIs) across Croatia, Cyprus, Greece, Poland, and Portugal has revealed mixed results. While there are some positive developments in the recognition and integration of NBS into the curriculum of certain courses, overall, the incorporation of NBS principles and practices is still lacking.

In Croatia, NBS are not formally recognized as a part of most course curriculums, including those related to social economy, but across several universities some examples of NBS practices in SE related HEIs were found. In Cyprus, NBS are formally recognized in some STEM courses, but there is a need for further integration into social entrepreneurship and economy courses. Cyprus also boasts several research centres dedicated to NBS and the social economy sector. In Greece, the inclusion of NBS in higher education curricula is limited, with agricultural,

environmental, and engineering programs being the main focus. While some innovative practices exist, they are predominantly found in STEM and natural science departments. Initiatives promoting an interdisciplinary approach and the role of social economy in addressing social problems do exist, but they are not widespread. Polish universities showcase diverse activities related to NBS and sustainability. While the presence of NBS content in educational curricula is discussed, specific examples of initiatives outside of degree programs are highlighted. Additionally, general university policies and green directions demonstrate a commitment to sustainability. In Portugal, the implementation of NBS in HEIs is also unsatisfactory. NBS concepts are primarily present in STEAM courses, with limited integration into social economy curricula. Faculties offering science, technology, and engineering courses show a greater emphasis on NBS compared to those in public administration and social sciences.

Overall, the findings highlight the need for increased recognition and formal integration of NBS into HEI curriculums, particularly in the social economy field. While positive examples of courses, projects, and initiatives exist, further efforts should be made to ensure that NBS principles and practices are incorporated comprehensively across various academic disciplines. This would promote a holistic understanding of sustainable solutions among students and contribute to the development of evidence-based policies and practices supporting the social economy sector and environmental sustainability.

Eco-citizenship in SE studies

This study provided also the state of the art on eco-citizenship in relation to SE studies in the SEgoesGreen consortium countries, namely Poland, Greece, Cyprus, Croatia, and Portugal. The partner organizations conducted an overview of the presence of eco-citizenship in their respective countries, researched and presented each country's policies for promoting and protecting activities that enhance eco-citizenship, and collected best practices of eco-citizenship in SE studies from their own countries and globally. During this task, several trends and common themes were observed.

The national policies were found to be similar and reinforced by shared EU policies. Similarities were also noticed among certain types of practices, such as courses and master's programmes, as well as some adopted teaching methodologies, such as service learning. Additionally, a more subtle similarity was found in that the majority of these practices indirectly promoted or fostered eco-citizenship, with the activities having different specific aims while simultaneously developing eco-citizenship through the acquisition of new skills and the support of existing skills and competencies.

During the cross-country analysis, it was observed that a significant barrier exists in the fact that most eco-citizenship practices in SE studies are not explicitly designed to target the

development of eco-citizenship. Instead, they aim to achieve eco-citizenship indirectly. While these activities focus on different specific objectives and on the acquisition of new green skills and competencies, the explicit promotion of eco-citizenship remains a secondary goal. This barrier highlights the need for a more deliberate and intentional approach to integrate eco-citizenship into SE studies. Efforts should be made to incorporate eco-citizenship as a central aspect of the SE curricula, ensuring that students are equipped with the knowledge, values, and skills necessary to become active and engaged eco-citizens. By addressing this barrier, SE studies can play a more transformative role in promoting sustainable practices and behaviours among future professionals.

However, there are opportunities for progress in the field. It is recommended that further research and collaboration be undertaken to explore innovative teaching methodologies and pedagogical approaches that can explicitly target the development of eco-citizenship within SE studies. This could involve the adaptation of existing courses and programmes, the inclusion of specific modules or projects dedicated to eco-citizenship, and the integration of real-world sustainability challenges into the learning process. By proactively dealing with the previous challenges, SEgoesGreen consortium countries, in collaboration with the broader EU community, can unlock the full potential of eco-citizenship within SE studies and contribute to the achievement of sustainable development goals at both national and European levels.

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Case studies of nature-based solutions in HEIs

After the mapping of best practices and conducting interviews with stakeholders, case studies were developed to facilitate a more in-depth exploration of barriers and opportunities to embed sustainability education powered by NBS in SE faculties. These case studies encompass examples from diverse levels of higher education, ranging from bachelor's and master's degree programs to postgraduate studies. They incorporate various educational formats, such as summer schools, laboratories, elective courses, and degree programs across different levels of higher education which offer comprehensive education on NBS and related topics. These examples can serve as valuable examples for other institutions seeking to incorporate active learning in environmental sustainability and particularly NBS within their educational settings.

Various fields of study are encompassed within these best practices, reflecting the inherent interdisciplinarity of the topic. This interdisciplinary nature necessitates an integrated approach to teaching, fostering collaborative initiatives and the development of joint courses/ programs/ degrees that incorporate diverse perspectives. Interdisciplinarity in teaching this topic has shown to be important, if not even indispensable, in delivering valuable knowledge to students. Thus, examples from non-SE faculties are also important and can offer valuable insights and ideas on how to foster collaboration across diverse disciplines, facilitating the creation of interdisciplinary educational practices. This extends to SE faculties which are expected to play an important role in the green transition.

These case studies highlight diverse pedagogical approaches that can significantly enhance the modernization of sustainability education, especially in SE faculties, positioning them as key drivers of the green transition. In addition to traditional teaching methods such as lectures, classroom exercises, and seminars, these best practices include various contemporary teaching methods. These include experiential learning, project-based learning, diverse teamwork activities (such as discussions, debates and brainstorming) and interdisciplinary/ transversal learning. These methods incorporate interactive elements carefully designed to engage and activate students in their learning journey. Most of the best practices include hands-on approaches to "learning for the green transition". This pedagogical diversity empowers students to engage in practical projects, fostering teamwork and awareness of personal responsibility. Equally important, these approaches facilitate interactive discussions and foster critical thinking skills.

In addition to presenting the best practices from project partner countries, these case studies highlight various challenges in implementing NBS in HEIs. These challenges include a lack of interdisciplinary knowledge, insufficient support both from state and university and financial constraints among others. Many of these best practices emphasize the importance of adopting an interdisciplinary approach when teaching NBS, which can, in itself, present administrative challenges. Limited recognition and absence of NBS from state and university policies necessitates a push for change. Incorporating a range of stakeholders into NBS education has emerged as a valuable practice across these educational contexts. It not only helps address challenges related to interdisciplinarity and trans-disciplinarity, but also facilitates hands-on approaches. Therefore, the most important challenge of overcoming interdisciplinarity challenges is effectively tackled by engaging individuals from diverse backgrounds in teaching and various stakeholders of diverse NBS initiatives.

This study demonstrates the important role of HEIs in promoting environmental sustainability and NBS education. It encompasses examples from both SE and non-SE faculties, as it seeks to explore the potential of NBS and eco-citizenship education to be integrated in SE faculties. Additionally, the study delves into impact of contextual factors on the adoption of NBS –

oriented programs. Thus, this research offers new knowledge and practical insights to SE faculties for integrating NBS... …#add insights from workshops

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Appendix 1

a. Annex Croatia

Country of the best practice initiative	Croatia
City of the best practice initiative	Zagreb
Field of study	Business and Economics, Social Economy
Institution	VERN
Level of study	Bachelor
Course	Social entrepreneurship and social innovation
NBS category	Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,)
Topic of the best practice initiative	project-based learning through developing sustainability of local community at one of the most isolated Croatian islands (Vis)
Best practice objectives	The aim of several projects that included students of SE was to improve the lives of the inhabitants of the island of Vis, as an example of isolated, distant, and rural community.

Best practice results/ Impact	Ecological revitalization of the traditional solutions in the contemporary life, improved well-being for the local community, revival of natural solutions
Engaged stakeholders	Students, local associations, local stakeholders
Pedagogical approach	project based learning, problem-based learning, participatory action research, service learning
Important considerations (if applicable)	NA
Responsible partner that collected the practice	UNIZG

Country of the best practice initiative	Croatia
City of the best practice initiative	Zagreb
Field of study	Business and Economics
Institution	Faculty of Economics and Business, University of Zagreb (FEB Zagreb)
Level of study	Master's
Course	Change management

NBS category	Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...), natural solutions for health protection
Topic of the best practice initiative	Students independently develop projects that support NBS
Best practice objectives	Students' recognized that there are many traditional healing practices based on medicinal substances of natural origin, so their intention was to support the use of plants as traditional remedies instead of just man-made versions of medicines.
Best practice results/ Impact	students have organized workshops on aromatherapy and healing herbs; students managed to increase awareness about health issues and herbal medicine, provided information on natural solutions for disease prevention among targeted population and enhanced general wellbeing
Engaged stakeholders	Students, small entrepreneurs, general population
Pedagogical approach	problem-based learning, participatory action research
Important considerations (if applicable)	This example of best practice is unique as it relies on students' initiatives to implement NBS as a part of their course requirements
Responsible partner that collected the practice	UNIZG

Country of the best practice initiative	Croatia

City of the best practice initiative	Zagreb
Field of study	Natural Sciences, Social Sciences, Humanities, Arts and Design
Institution	University of Zagreb
Level of study	Bachelor
Course	Creative laboratory
NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...)
Topic of the best practice initiative	The intention of this project proposal developed by students was the redesign of the lightning system in Zagreb, in order to be aligned with natural patterns and to decrease light pollution and potential substantial harmful impact on animals.
Best practice objectives	The “Creative laboratory” is an advanced educational practice that enables students to experience teamwork on projects with interdisciplinary foundations, through the connection of science and art. The key goal of this modern course is to broaden students’ horizons, stimulate creativity and improve communication skills through functioning in a diverse and complex environments. Such environments can be stimulative for NBS.
Best practice results/ Impact	Students developed innovative ideas on ways to decrease pollution through “smart lightning” which would enable the reduction of energy costs but also create more favorable living conditions for

	animals, as both plants and animals have developed definitive rhythms based on the changing day and night patterns.
Engaged stakeholders	Educators, students
Pedagogical approach	problem-based learning, action competence learning, community service learning
Important considerations (if applicable)	This example of best practice is exploiting student creativity and shows that students' joint participation in critical analysis and creative synthesis with students from other faculties can be a legitimate source of NBS that can be applied with respect to different reference points. This particular case of best practice shows that multidisciplinary student groups can lead do especially creative solutions, including development of NBS.
Responsible partner that collected the practice	UNIZG

Country of the best practice initiative	Croatia
City of the best practice initiative	Zadar
Field of study	Social Sciences, Business and Economics
Institution	University of Zadar, Department for Tourism and Communication Sciences

Level of study	Master's
Course	Cultural and natural heritage in tourism
NBS category	Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...), Sustainable tourism solutions
Topic of the best practice initiative	Traditional agricultural methods for sustainable tourism
Best practice objectives	Through game and project-based learning, students learned about plant growing and traditional farming methods, i.e. students were empowered to deal with local sustainability challenges
Best practice results/ Impact	Developing solutions for the management of micro-tourism destinations in order to encourage local communities to deal with the impact of the tourism industry, but at the same time preserve natural and cultural heritage and lifestyle
Engaged stakeholders	Educators, students, local stakeholders
Pedagogical approach	Game, project-based learning, problem-based learning
Important considerations (if applicable)	NA
Responsible partner that collected the practice	UNIZG

Country of the best practice initiative	Croatia
City of the best practice initiative	Zagreb
Field of study	Social Sciences, Business and Economics, Social Economy
Institution	Faculty of Economics and Business, University of Zagreb
Level of study	Master's
Course	Marketing of non-profit organizations
NBS category	Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...),
Topic of the best practice initiative	Supporting the development of civil society organizations that support NBS. The aim of this teaching approach was to improve management in civil society organizations, increase social responsibility and contribute to community development, which is also a broader objective of NBS.
Best practice objectives	Sustainable development by supporting and encouraging citizens and communities to self-organize in order to initiate change. Students supported association that developed communal gardens on neglected city land in the Zagreb urban area, according to permaculture principles. It also educated citizens of Zagreb about the need and benefits of composting, in order to solve the problem of accumulating organic waste in gardens.

Best practice results/ Impact	In addition to improving their skills, students in this way developed the habit of volunteering and civic engagement in associations supporting NBS. However, the greatest benefit was students' feeling that they are doing something useful for the community and that their knowledge and skills can be used for the benefit of the community.
Engaged stakeholders	Educators, students, civic society organizations, local population
Pedagogical approach	community service learning
Important considerations (if applicable)	NA
Responsible partner that collected the practice	UNIZG

b. Annex Cyprus

B. Country of the best practice initiative	Cyprus
City of the best practice initiative	Nicosia
Field of study	Engineering, Business and Economics, Education
Institution	The Open University of Cyprus (OUC)

Level of study	Master's
Course	Environmental Conservation and Management
NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...), sustainable development
Topic of the best practice initiative	promote nature-based solutions for urban regeneration and enhance the environmental quality of cities. The project includes the implementation of several pilot actions, including the creation of green roofs and walls, the installation of rainwater harvesting systems, and the development of urban green spaces.
Best practice objectives	The postgraduate degree in “Environmental Conservation and Management” adopts a multidisciplinary approach to environmental protection aimed at contributing to the dialogue within social and political levels while, at the same time, offering students a high level of expertise in environmental management. The objective is to promote sustainable management practices and techniques regarding environmental issues.

Best practice results/ Impact	Educating and training future environmental leaders: The program equips students with the knowledge and skills necessary to address complex environmental issues and effectively manage natural resources. Graduates of the program will be well-prepared for careers in a variety of fields related to environmental conservation and management. Advancing environmental research: The program's emphasis on environmental science and policy helps to support research efforts in areas such as climate change, biodiversity conservation, and ecosystem management. Graduates of the program may also pursue advanced degrees and contribute to ongoing research in these fields. Promoting sustainable development: The program's focus on sustainability and natural-based solutions helps to promote a more sustainable approach to development. Graduates of the program may work in fields such as environmental consulting or policy, where they can promote sustainable development practices and help to reduce the environmental impact of development projects. Enhancing environmental awareness and advocacy: The program can also help to raise awareness of environmental issues and promote environmental advocacy efforts. Graduates of the program may become leaders in local or global environmental organizations, advocating for policies and practices that promote environmental conservation and sustainability.

Engaged stakeholders	Community involvement in land-use planning: Engaging community members in the planning process can help to ensure that local needs and concerns are addressed and that the project is more likely to be successful. Collaboration with local businesses: Working with local businesses to implement sustainable practices can help to reduce the environmental impact of their operations and contribute to the local economy. Partnership with NGOs and government agencies: Collaborating with NGOs and government agencies can help to leverage their expertise and resources and build support for the project. Stakeholder consultations and feedback: Engaging stakeholders through consultations and feedback processes can help to ensure that their perspectives are heard and addressed, and that the project is more likely to be successful.

Pedagogical approach	Interactive learning: The program emphasizes interactive learning, including group work, case studies, and problem-based learning, to encourage students to engage with the material and apply it in real-world scenarios. Experiential learning: The program incorporates experiential learning opportunities, such as fieldwork, internships, and research projects, to provide students with hands-on experience in environmental conservation and management. Multidisciplinary approach: The program takes a multidisciplinary approach, incorporating a wide range of disciplines such as biology, chemistry, geology, and physics to provide students with a broad understanding of environmental science and management. Technology-enhanced learning: The program utilizes technology-enhanced learning methods, such as online learning platforms, interactive simulations, and multimedia resources, to enhance students' learning experience and provide them with flexible learning options. Sustainability and ethical considerations: The program emphasizes sustainability and ethical considerations in environmental management, encouraging students to consider the social, economic, and environmental impacts of their decisions.
Important considerations (if applicable)	https://www.ouc.ac.cy/index.php/en/studies/master/master-dpp-2
Responsible partner that collected the practice	SYNTHESIS

Country of the best practice initiative	Cyprus
City of the best practice initiative	Nicosia

Field of study	Arts and Design
Institution	The University of Cyprus
Level of study	Teaching and Research Staff
Course	Sustainable campus design
NBS category	Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Sustainable waste management (e.g. waste reduction and recycling programs, composting programs/upcycling programs,...), Air quality (e.g.: installation of air quality monitoring stations, development of educational programs on air quality, encouragement of alternative transportation methods), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)
Topic of the best practice initiative	The University of Cyprus has implemented a sustainable campus design that not only focuses on reducing the environmental impact of its buildings but also provides a healthy and productive environment for its students and faculty members.

Best practice objectives	Reducing the environmental impact of the campus: By using natural materials, incorporating green infrastructure, and conserving resources such as water, the project aims to reduce the campus's overall environmental impact. This will help to mitigate climate change, reduce waste, and preserve natural resources. Promoting sustainable practices: The project aims to promote sustainable practices among students, faculty, and staff members by showcasing the benefits of sustainable design and encouraging behaviour change. This could include initiatives such as bike-sharing programs, composting, and education campaigns. Creating a healthy and productive environment: The project aims to create a healthy and productive environment for students and faculty members by improving air quality, reducing noise pollution, and providing access to green spaces. This could have a positive impact on academic performance, mental health, and wellbeing. Leading by example: The project aims to set an example for other institutions and organizations by demonstrating that sustainable design is feasible and can have multiple benefits. This could inspire other universities and organizations to adopt similar practices and contribute to a more sustainable future. Meeting sustainability goals: The project may also aim to meet sustainability goals set by the university or government. For example, the university may have a goal to reduce its carbon footprint or water consumption, and the sustainable campus design could help to achieve these targets.

Best practice results/ Impact	Environmental impact: The project is expected to reduce the campus's overall environmental impact by using natural materials, incorporating green infrastructure, and conserving resources such as water. This could reduce greenhouse gas emissions, preserve natural resources, and contribute to mitigating the effects of climate change. Health and wellbeing: By improving air quality, reducing noise pollution, and providing access to green spaces, the project could have a positive impact on the health and wellbeing of students and faculty members. This could lead to improved academic performance, mental health, and overall quality of life. Education and awareness: The project could raise awareness among students, faculty, and staff members about the importance of sustainable design and practices. This could inspire behaviour change and encourage a broader understanding of sustainability issues. Leadership and inspiration: By setting an example for other institutions and organizations, the project could inspire others to adopt similar practices and contribute to a more sustainable future. Economic impact: The project could also have economic benefits, such as reducing energy and water bills and creating new jobs in sustainable industries.

Engaged stakeholders	University administration: The university administration is responsible for approving and implementing the sustainable campus design project. They are responsible for ensuring that the project aligns with the university's mission and values and that it meets sustainability goals. Students: Students are the primary users of the campus and will benefit directly from the sustainable campus design. They may be interested in the project's impact on their academic performance, health and wellbeing, and quality of life. Faculty and staff members: Faculty and staff members also work on the campus and will benefit from the project's impact on their health and wellbeing. They may also be interested in the project's impact on the university's sustainability goals and its reputation. Local community: The local community may also have a stake in the sustainable campus design project. The project could have an impact on the local environment, such as improving air quality and reducing the urban heat island effect. The community may also be interested in the project's impact on the local economy, such as creating new jobs in sustainable industries. Contractors and suppliers: Contractors and suppliers are responsible for implementing the sustainable campus design. They may be interested in the project's impact on their business, such as creating new opportunities in sustainable construction and providing exposure to new technologies and materials.
Pedagogical approach	Overall, the sustainable campus design project at the University of Cyprus can provide numerous opportunities for incorporating pedagogical approaches that foster active learning, community engagement, and sustainable development.

Important considerations (if applicable)	Sustainable design principles: The project should incorporate sustainable design principles such as using natural materials, reducing energy and water consumption, and promoting biodiversity. This ensures that the project is environmentally friendly, energy-efficient, and promotes sustainability. Cost-effectiveness: The project's cost-effectiveness is another important consideration, as it determines the financial feasibility of the project. Sustainable design features can sometimes add initial costs to the project, but they can reduce long-term operational costs and provide a return on investment. Maintenance and monitoring: The project's maintenance and monitoring should be considered from the outset to ensure the project's longevity and continued success. This includes ensuring that the green infrastructure is well-maintained and that the water-saving features are working correctly. Education and awareness: The sustainable campus design project should be accompanied by an educational component to raise awareness and promote sustainable behaviour among the campus community. This can include sustainability workshops, educational materials, and awareness campaigns.
Responsible partner that collected the practice	SYNTHESIS

Country of the best practice initiative	Cyprus
City of the best practice initiative	Limassol
Field of study	Education
Institution	The Cyprus University of Technology

Level of study	Bachelor
Course	Environmental Sciences and Technology
NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Sustainable waste management (e.g. waste reduction and recycling programs, composting programs/upcycling programs,...), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...), Air quality (e.g.: installation of air quality monitoring stations, development of educational programs on air quality, encouragement of alternative transportation methods), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)
Topic of the best practice initiative	The Cyprus University of Technology offers a Bachelor's degree in Environmental Sciences and Technology that focuses on environmental education. This program provides students with the knowledge and skills needed to promote natural-based solutions in their communities

Best practice objectives	To provide students with a strong foundation in the scientific principles that underpin environmental science, including ecology, biodiversity, and sustainability. To develop students' understanding of the legal and policy frameworks that govern environmental protection and management. To equip students with the skills and knowledge they need to develop and implement environmental education programs for different audiences, including schools, communities, and businesses. To provide students with hands-on experience through fieldwork, laboratory experiments, and research projects. To prepare graduates for careers in the environmental sector, including environmental education, policy development, and management. To equip graduates with the knowledge and skills to pursue further studies in environmental science or related fields, such as ecology, conservation, or sustainable development. To promote the use of natural-based solutions in addressing environmental challenges and promoting sustainability in communities. To develop graduates' abilities to critically analyze and evaluate environmental issues and solutions. To foster graduates' commitment to ethical and responsible environmental practice.

Best practice results/ Impact	Firstly, this program aims to equip students with the knowledge and skills needed to promote natural-based solutions in their communities. Graduates of this program are likely to have a deep understanding of the importance of sustainability and be well-equipped to advocate for environmentally responsible practices in their communities. This could lead to a reduction in environmental degradation and increased awareness of sustainable practices in communities. Secondly, the program's focus on environmental education means that graduates are well-prepared to develop and implement environmental education programs for different audiences, including schools, communities, and businesses. This could lead to a greater awareness and understanding of environmental issues, as well as increased engagement with sustainability practices at all levels of society. Thirdly, the program's emphasis on hands-on experience through fieldwork, laboratory experiments, and research projects means that graduates are well-prepared to address complex environmental challenges facing our planet. Graduates are likely to be well-equipped to apply their knowledge and skills to real-world environmental problems, leading to the development of innovative and effective solutions. Finally, the program's focus on promoting natural-based solutions in addressing environmental challenges and promoting sustainability in communities means that graduates are likely to make a positive impact on the environment. Graduates may be well-positioned to work in environmental management and policy development, leading to a reduction in environmental degradation and increased awareness of sustainable practices in society.

Engaged stakeholders	Faculty members: Faculty members are the primary stakeholders in any academic program. They are responsible for designing the curriculum, teaching courses, and assessing student learning outcomes. In an environmental science and technology program, faculty members may have expertise in fields such as environmental science, engineering, policy, or social sciences. Students: Students are also important stakeholders in the program. They are the primary recipients of the program's educational content and play an active role in their own learning. Engaged students may participate in research projects, internships, or other experiential learning opportunities, which can enhance their understanding of environmental issues. Community partners: Community partners can provide valuable opportunities for students to apply their learning to real-world environmental issues. They may include non-profit organizations, government agencies, or businesses that are working on environmental initiatives. Community partners can provide internships, research opportunities, or service learning projects that allow students to gain practical experience in the field. Alumni: Alumni can play an important role in supporting the program by providing mentorship or networking opportunities for current students. They may also serve as guest speakers or provide financial support to the program. Professional organizations: Professional organizations in the field of environmental science and technology can provide opportunities for students to connect with professionals working in the field. They may provide networking opportunities, career advice, or professional development resources to students.
Pedagogical approach	.
Important considerations (if applicable)	.
Responsible partner that collected the practice	SYNTHESIS

Country of the best practice initiative	Cyprus
City of the best practice initiative	Nicosia
Field of study	Natural Sciences, Engineering, Education
Institution	The Sustainable Energy Research Center (SERC)
Level of study	Teaching and Research Staff
Course	The Sustainable Energy Research Center (SERC)
NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Sustainable waste management (e.g. waste reduction and recycling programs, composting programs/upcycling programs,...), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...), principles of solar energy and photovoltaic systems
Topic of the best practice initiative	The Photovoltaic Expert Certification Program

Best practice objectives	Promoting the adoption and use of renewable energy technologies, particularly photovoltaic systems, in Northern Cyprus and beyond. Providing comprehensive training to professionals on the principles of solar energy and photovoltaic systems, enabling them to design, install and maintain these systems effectively. Conducting research on renewable energy technologies, including photovoltaics, solar thermal systems, and energy efficiency/management, to develop a better understanding of the benefits and challenges associated with these technologies. Providing recommendations to policymakers and government agencies on renewable energy and energy efficiency policies and strategies. Supporting the transition to a more sustainable energy future by reducing reliance on fossil fuels and promoting the use of clean energy technologies. Collaborating with other organizations and stakeholders to advance the development and adoption of sustainable energy practices. Raising awareness and promoting education on sustainable energy practices among the general public and students.
Best practice results/ Impact	Increasing the adoption of photovoltaic systems and other renewable energy technologies, which can help to reduce greenhouse gas emissions and mitigate climate change. Improving the skills and knowledge of professionals working in the renewable energy sector, which can lead to better-designed, more efficient photovoltaic systems and other renewable energy projects. Advancing research on renewable energy technologies, which can contribute to the development of new technologies and more effective policies and strategies for promoting sustainable energy practices. Informing policymakers and government agencies about the benefits and challenges associated with renewable energy technologies, which can help to shape energy policy and promote the adoption of sustainable energy practices. Contributing to the growth of the sustainable energy industry, which can create new job opportunities and economic benefits. Raising awareness and promoting education on sustainable energy practices among the general public and students, which can lead to greater public support for sustainable energy and a more informed and engaged citizenry.

Engaged stakeholders	Professionals in the renewable energy sector: Professionals working in the renewable energy sector, including engineers, technicians, and project managers, may be engaged with SERC and the Photovoltaic Expert Certification Program. They may participate in the program to improve their skills and knowledge, or collaborate with SERC on research projects. Policymakers and government agencies: Policymakers and government agencies, particularly those responsible for energy policy and regulation, may be engaged with SERC to learn about renewable energy technologies and to seek recommendations on energy policy and strategy. Academic and research institutions: Academic and research institutions may collaborate with SERC on research projects related to renewable energy technologies. Industry associations and advocacy groups: Industry associations and advocacy groups focused on promoting sustainable energy practices may be engaged with SERC and the Photovoltaic Expert Certification Program to collaborate on research and advocacy efforts. Local communities: Local communities may benefit from the increased adoption of photovoltaic systems and other renewable energy technologies, and may be engaged with SERC through public education and outreach efforts. Students and educators: Students and educators may be engaged with SERC and the Photovoltaic Expert Certification Program through training and educational initiatives focused on sustainable energy practices.
Pedagogical approach	.
Important considerations (if applicable)	https://www.ciu.edu.tr/en/about-us/impact/sustainability
Responsible partner that collected the practice	SYNTHESIS

Country of the best practice initiative	Cyprus
City of the best practice initiative	Nicosia
Field of study	Urban Entrepreneurship
Institution	C4E: Centre for Entrepreneurship
Level of study	Bachelor, Master's
Course	'Urban Entrepreneurship: Opportunities in times of uncertainty'
NBS category	Sustainable cities: to build resilient societies and economies by creating better green public spaces, better transport systems, creating sustainable business opportunities, and improving urban planning and management.
Topic of the best practice initiative	Urban Entrepreneurship

Best practice objectives	Acquired an understanding of the field entrepreneurship both theoretically and practically; Understand the different steps used by an entrepreneur to start a business; Identify and evaluate new business ideas; Gain awareness of the opportunities for entrepreneurship in relation to sustainable cities; An understanding of design thinking processes in developing your new ideas ; An appreciation of the types of problems that can generate entrepreneurial solutions; Learning by doing, by interacting with world class specialist in the field of creativity, innovation and urban studies; An acquisition of creative visualisation tools (e.g. diagramming, video, or storyboards, data visualisation etc) to use for the development of your business proposal;
Best practice results/ Impact	It gave university students the opportunity to address urban challenges, understand social entrepreneurship and develop their business ideas. The course aspired to develop creative solutions and address social, urban, strategic, and organizational problems, through the development of prototypes that could lead to business proposals. The final event took place at the Nicosia Municipality Rooftop terrace where the 20 enrolled students pitched their project ideas to the 'Urban Council' and to the public.
Engaged stakeholders	University of Cyprus, Urban Gorillas, PwC Cyprus

Pedagogical approach	Blended learning: Lectures, workshops, roundtable discussions, urban walks and project development: The course will adopt diverse teaching techniques, engaging mentors and lecturers from the business, academia, but also the arts world. It will be composed of blended learning with daily online lectures and exercises based on the design thinking principles, discussions and group work together with mentors. The course will feature lectures from professors working in the fields of economics, entrepreneurship, innovation and urbanism enhanced by workshops led by artists, architects and other creatives. The last five days are designed as a sprint where business proposals will be developed along with daily thematic lectures and workshops
Important considerations (if applicable)	https://www.c4e.org.cy/events/news/item/379-02-july-c4e-104-urban-entrepreneurship-opportunities-in-times-of-uncertainty https://www.c4e.org.cy/events/news/item/419-c4e-newsletter-february-2022-volume-9 Video: https://www.youtube.com/watch?v=sZTGUSLS2W8
Responsible partner that collected the practice	SYNTHESIS

Country of the best practice initiative	Cyprus
City of the best practice initiative	Nicosia
Field of study	Law and Politics, Arts and Design, urban development
Institution	University of Cyprus

Level of study	Bachelor
Course	U-SOLVE
NBS category	Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)
Topic of the best practice initiative	Intends to enhance support to young entrepreneurs in urban areas with focus on the environment and sustainable development in the Mediterranean region.
Best practice objectives	To create a model of urban development based on innovative entrepreneurship, addressing sustainable development challenges, boosting urban business ecosystems and creating jobs in emerging social and environmental markets
Best practice results/ Impact	Start-ups and young enterprises addressing sustainable development challenges managed by / employing youth (highly educated, between 24 and 35 years old) and/or women (all ages) A toolbox for the implementation of an effective, SDG-driven open innovation process Multilevel policy recommendations for urban sustainable development strategies based on impact-oriented entrepreneurship, (iv) a Mediterranean network of stakeholders of impact-oriented entrepreneurship.
Engaged stakeholders	potential entrepreneurs start-ups operating in urban contexts Local urban populations University of Cyprus The Cyprus Institute
Pedagogical approach	l

Important considerations (if applicable)	https://www.enicbcmed.eu/projects/u-solve
Responsible partner that collected the practice	SYNTHESIS

Country of the best practice initiative	Cyprus
City of the best practice initiative	Limassol District: Kapilio and Anogyra villages
Field of study	Natural Sciences
Institution	Terra Cypria
Level of study	Teaching and Research Staff
Course	AgroLIFE
NBS category	Conservation of High Nature Value Farmlands (HNVF) in Cyprus.

Topic of the best practice initiative	HNVFs sustain traditional methods of low-input farming supporting biodiversity and ecosystem services while maintaining natural and structural elements important at National and European level. To conserve and demonstrate actions that highlighted the importance of two historical HNVFs in Cyprus: the traditional vineyard agroecosystem in the rural area of Kapilio and the carob agrosilvopastoral system at the Anogyra village.
Best practice objectives	Conserve biodiversity in vineyards and carob groves, with a strong focus on species listed in the Birds and Habitats Directives Support and promote sustainable agricultural practices that enhance ecosystem services and conserve biodiversity in HNVF. Identify strengths and weaknesses of current agricultural management practices with respect to biodiversity conservation in HNVF. Identify strengths and weaknesses of bioindicators for evaluation of HNVFs in small scale agriculture Build a knowledge base for vineyard and carob grove HNVF, in Cyprus Encourage stakeholder involvement and increase public awareness regarding HNVF issues through active participatory learning.
Best practice results/ Impact	Restoration and diversification of traditional hedgerows and planting of floral strips Restoration of stonewalls and creation of microhabitats for important conservation species Reinstating traditional grazing regimes in under grazed and overgrazed carob groves Restoration of abandoned carob grove and vineyard Implementation of sustainable agricultural practices Mobilising and informing local farmers
Engaged stakeholders	The Cyprus University of Technology (CUT), Open University of Cyprus (OUC), The Department of Environment, local farmers

Pedagogical approach	Place based learning, Civic ecology education Community service learning
Important considerations (if applicable)	https://agrolife.eu/the-project/
Responsible partner that collected the practice	SYNTHESIS

c. Annex Greece

Country of the best practice initiative	Greece
City of the best practice initiative	Thessaloniki
Field of study	Law and Politics
Institution	Aristotle University of Thessaloniki
Level of study	Bachelor
Course	European and International Environmental Governance

NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...)
Topic of the best practice initiative	Biodiversity conservation, circular economy, climate change adaptation
Best practice objectives	To teach undergraduate students the value of NBS in the EU and International Environmental Governance; to assist students in creating environmental students groups; to encourage students to develop further their understanding of NBS, enforce their skills on NBS and maybe use them in their future careers.
Best practice results/ Impact	Undergraduate students study a topic not so popular in the School of Law. They develop new skills, and in many cases they continue with master studies on respective fields.
Engaged stakeholders	Students, educators
Pedagogical approach	Formal education, classroom learning, assessment of competences, pedagogy for eco-justice, research based on a curriculum
Important considerations (if applicable)	Teaching NBS is part of the undergraduate course "EU and International Environmental Governance" of the School of Law, Aristotle University of Thessaloniki, https://qa.auth.gr/en/class/1/600126983/M1
Responsible partner that collected the practice	UOM

Country of the best practice initiative	Greece
City of the best practice initiative	Lesvos
Field of study	Natural Sciences
Institution	Center for Sustainable Circular Bioeconomy and Energy of the Department of Environment at the University of the Aegean on the island of Lesvos
Level of study	Master's, PhD, Posdoctoral, Teaching and Research Staff
Course	It is a research project of which fifteen (15) teaching staff members from three (3) university departments as well as five (5) special technical laboratory staff are part, while thirty (30) new job positions have been created (25 researcher positions and 5 positions for technical and administrative support of the project)
NBS category	Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Sustainable waste management (e.g. waste reduction and recycling programs, composting programs/upcycling programs,...), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...), tourism sector
Topic of the best practice initiative	Sustainable and Circular Bioeconomy in the insular region of North and South Aegean

Best practice objectives	knowledge and specialization of scientists; developing new technologies; interdisciplinary education and training; national and international networks of the University of the Aegean; new regional planning aligned with the environmental legislation
Best practice results/ Impact	renewal of industries, modernisation of the primary production systems, protection of the environment and enhancing biodiversity
Engaged stakeholders	educators, students, staff, policymakers
Pedagogical approach	problem-based learning, pedagogy for eco-justice, action competence learning, participatory action research, socioscientific inquiry based learning
Important considerations (if applicable)	https://bioeconomy.aegean.gr/en/p/about
Responsible partner that collected the practice	UOM

Country of the best practice initiative	Greece
City of the best practice initiative	Thessaloniki
Field of study	Engineering
Institution	Aristotle University of Thessaloniki

Level of study	Master's
Course	MASTER "LANDSCAPE ARCHITECTURE AUTH"
NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)
Topic of the best practice initiative	Landscape architecture
Best practice objectives	To teach the postgraduate students basic knowledge and techniques on planning of the suburban, rural and natural landscapes (ecological planning and sustainable development, landscape preservation, restoration and rehabilitation etc.)
Best practice results/ Impact	Supplies students with specialized theoretical knowledge, so that they can comprehend the basic principles of Landscape Architecture; lays the foundations for the correct methodology of research and provides the impetus for post-graduate students to carry out further research.
Engaged stakeholders	educators, students
Pedagogical approach	formal education; competence-based learning and accreditation;
Important considerations (if applicable)	The Post-Graduate programme in Landscape Architecture is run by two schools, the School of Architecture, and the School of Agriculture, http://land-arch.web.auth.gr/introduction

Responsible partner that collected the practice	UOM

Country of the best practice initiative	Greece
City of the best practice initiative	Thessaloniki
Field of study	Agricultural
Institution	Perrotis College (Private Institution)
Level of study	Professional education
Course	School of Professional Education (Agricultural Extension Services)
NBS category	Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...)
Topic of the best practice initiative	Training programs, counselling and field research through Corporate Social Responsibility programs
Best practice objectives	optimize production and secure environmental protection for the agrifood sector
Best practice results/ Impact	Partnerships are created between the School and the agricultural and industrial sector of Greece and abroad, aiming to create a unique culture of cooperation that will increase productivity and reinforce economic growth
Engaged stakeholders	students, employers, associations

Pedagogical approach	Experiential education, skill improvement, mentoring and extroversion activities connected to networking and clustering, place based learning, problem-based learning, civic ecology education, pedagogy for eco-justice
Important considerations (if applicable)	https://www.perrotiscollege.edu.gr/cae/
Responsible partner that collected the practice	UOM

Country of the best practice initiative	Greece
City of the best practice initiative	Athens
Field of study	Natural Sciences, Engineering, Social Sciences
Institution	National Technical University of Athens
Level of study	Bachelor
Course	Competition
NBS category	Sustainable entrepreneurship
Topic of the best practice initiative	Green Tech Challenge (https://greentechchallenge.gr/)

Best practice objectives	GreenTech Challenge is the largest National Green Innovation Programme. It is about a competition that has already been organised for 6 times in the past and was initiated by the Research Unit of Economic Environment and Sustainable Development of the National Technical University of Athens. The competition was aimed at promoting new innovative ideas from students, researchers and young entrepreneurs in the field of the Environment, as well as to link them to the labour market from established companies operating in this field. The main goal of the programme is to train, advise and promote initiatives on the following topics: • Environment • Energy • Smart & Sustainable Cities • Innovative Green Products & Advanced Materials • The Factory of the Future • Fossil Raw Materials • Blue Growth • Sustainable Tourism As part of the programme new opportunities are offered to students and researchers to be trained don their selected topic through 4 bootcamp trainings and one to one mentoring sessions, while the best teams are given the chance to be promoted in a six-month business incubation programme.
Best practice results/ Impact	By now, according to the official results for all rounds of this national programme it is observed that more than 4000 students and researchers have taken part in this programme and have received mentoring through this programme. Also, around 146 mentors have supported the participants improve their idea during the training sessions. Finally, another dimension of this programme's impact is related to the training of participants on Pitching and on how they can promote better their project.
Engaged stakeholders	Students in HE, policymakers, researchers who are interested in being trained in business model and in new competencies and want to develop innovative solutions related to the Environment, Climate Change and Sustainable Development.

Pedagogical approach	Involves students into green business incubators and to some extent a problem-oriented approach, as the competitors try to analyse their solution based on a topic or problem they achieve selected to tackle, as part of the project they design with the support of mentors.
Important considerations (if applicable)	It is a hackathon styled competition bootcamp where start-ups compete for funding. In addition, elements of problem-based learning are also incorporated in some parts of the training where the teams examine specific challenges they have identified.
Responsible partner that collected the practice	HUB21

Country of the best practice initiative	Greece
City of the best practice initiative	Nisyros island
Field of study	Natural Sciences
Institution	The summer school, as part of an interdisciplinary MSc programme, is offered by the Department of Geology and Geoenvironment of the National and Kapodistrian University of Athens (NKUA), by the Department of Forestry and Natural Environment of the International University of Greece (IHU) and by the UNESCO Chair on the Conservation and Ecotourism of Riparian and DeltaicEcosystem (Con-E-Ect).
Level of study	Master's

Course	MSc in Water, Biosphere and Climate Change
NBS category	Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Air quality (e.g.: installation of air quality monitoring stations, development of educational programs on air quality, encouragement of alternative transportation methods)
Topic of the best practice initiative	Summer School

Best practice objectives	It is about an educational hands-on training that takes the form of a summer school. It is part of the Interdisciplinary Programme of Postgraduate Studies (I.P.P.S.) “Water, Biosphere and Climate Change” of the National Kapodostrian University of Athens, of the International University of Greece (IHU) and of the UNESCO Chair on the Conservation and Ecotourism of Riparian and DeltaicEcosystem. The structure of this school is enriched with laboratory exercises and field courses related to the theoretical courses, as part of a Natural Science Laboratory. The objectives of summer school are: • To equip master’s students with practical experience and provide knowledge on the interaction between humans, living organisms, abiotic factors and water from an ecological, technical, political-economic and biological point of view, under conditions of ever-increasing climate change. • To engage students in ecological observations and ecotourism routes in the rich natural environment of Nisyros. • Education and research activities of postgraduate students. • Experimental measurements/analyses of environmental parameters and air pollution in the natural area of the caldera of the volcano of Nisyros volcano, with simultaneous training of postgraduate students. • Provide training to students in sustainable development methods for energy efficiency autonomy of the Greek islands (garbage management, wind and solar energy, wind and solar energy) The summer school has been included in the official course program of the Postgraduate School for one (1) week duration each year. The summer school will take place every year after the end of the courses and examinations of the Spring semester of the MSc, i.e. during the first ten days of June, in Nisyros. Link: https://daysofart.gr/en/education/msc-water-biosphere-and-climate-change-2/

Best practice results/ Impact	According to the feedback and the overall evaluation of participating professors and students of the summer school, it was observed that its activities were completed with great success. Both groups felt excited and very satisfied from all activities of this initiative (the theoretical course and fieldwork, such as laboratory exercises). Also, the students' active engagement with the nature and climate of the island helped them understand better through observation and experiments the natural environment, morphology and geology of the island's small villages. At the same time, there were also positive comments regarding students' interaction with the local community through their field trips that raised their awareness and improved their knowledge for this island's geological particularity. Link: https://hub.uoa.gr/summer-school-nisyros-review/
Engaged stakeholders	Students, professors, local community actors and stakeholders of Nisyros island.
Pedagogical approach	Experiential learning, action competence learning, field trips with geological observations and bioclimatic measurements in the villages of Nisyros within the framework of the bioclimatic urban planning.
Important considerations (if applicable)	N/A
Responsible partner that collected the practice	HUB21

Country of the best practice initiative	Greece
City of the best practice initiative	Thessaloniki

Field of study	Natural Sciences,
Institution	Aristotle University of Thessaloniki, Faculty of Forestry and Environmental Science
Level of study	All education levels
Course	Forest Botanic Garden
NBS category	Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...)
Topic of the best practice initiative	Forest Botanic Garden of the Aristotle University of Thessaloniki
Best practice objectives	The main objective of the Botanic Garden is to provide students at the Faculty of Forestry and Natural Environment with practical training. Students of all levels [primary and secondary schools, Higher Technological Education Institutions, Vocational Training Institutes, Vocational Training Centres, etc.] are also offered the opportunity to visit the garden. Links: https://www.auth.gr/en/university_unit/dasobotanikos-kipos-en/ , https://www.for.auth.gr/faculty/forest-botanic-garden

Best practice results/ Impact	The creation of this botanic garden that dates back to 1977 signifies its particular role for the city of Thessaloniki and especially for the academic community and for all students of the School of Forestry and Natural Environment which was relocated to the premises of the garden 15 years ago. This offers to students from all education levels and to the academic staff from this School the opportunity to visit the garden and put into practice their theoretical knowledge by observing through experiments the variety of plants and species of the garden, operating as a natural laboratory that preserves the local ecosystem and enhances the local biodiversity.
Engaged stakeholders	Educators, students
Pedagogical approach	Experiential learning, civic ecology education
Important considerations (if applicable)	Not every institution may have the space to operate a botanic garden
Responsible partner that collected the practice	HUB21

d. Annex Poland

Country of the best practice initiative	Poland
City of the best practice initiative	Łódź / Lodz (say: woodge)
Field of study	Natural Sciences, Social Sciences, Business and Economics, socio-economic geography and spatial management

Institution	University of Lodz
Level of study	Bachelor
Course	It is an interdepartmental full-time first-cycle studies implemented at the Faculty of Biology and Environmental Protection in cooperation with the Faculty of Economics and Sociology of the University of Łódź. It is a full-time program, not only one course, that combines issues of economics, the functioning of urban communities, land use and ecology and urban environmental protection.
NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), development of educational programs on city management, in accordance with the idea of sustainable development, green economy and environmental protection
Topic of the best practice initiative	The axis of education is the "city" understood as a space of concentration of natural resources, capitals and generation of income and benefits, including ecosystem services. The city is understood as a system requiring optimization of economic decisions in the context of natural and social conditions. A prerequisite for improving the quality and functionality of the urban environment is therefore education in resource-efficient, intelligent, co-responsible urban management.
Best practice objectives	The main goal of the EcoCity degree program is to educate professionals prepared to manage cities in accordance with the idea of sustainable development, green economy and environmental protection.

Best practice results/ Impact	According to study program graduates have the ability to grasp the relationship between the economic, social and environmental aspects of urban organisms and balancing development in various spheres. Thus, they understand the interactions between green and blue infrastructure for improving the functionality of the urban environment and providing ecosystem services to its residents. Graduates are also able to apply environmentally friendly solutions and reverse the effects of environmental degradation, contributing to better use of existing natural resources and improving the natural potential of the city.
Engaged stakeholders	The study program assumes enrichment of the didactic process by cooperation with practitioners involved in the "life" of the city and public institutions of the city of Lodz and the Lodz region. It assumes active cooperation with practitioners working in the public, private and social sectors. Practitioners enrich the didactic process with their knowledge and practical experience. They co-teach some of the field classes, apprenticeships and selected subjects. The study program lists a number of institutions with which cooperation is carried out.
Pedagogical approach	The curriculum for the EcoCity degree program involves a large number of intensive active classes, as well as a clear link between scientific research and the educational content provided. The program involves the use of blended learning techniques and modern computer software to increase the effectiveness and efficiency of education. Diverse didactic methods are used in the educational process, among them are both traditional (providing) methods and modern, interactive methods that activate the student to act. Among the pedagogical approaches used are: place based learning, problem-based learning, civic ecology education, action competence learning, community service learning, participatory action research.

Important considerations (if applicable)	The term "nature-based solutions" does not appear explicitly in the study program. However, an in-depth analysis of the curriculum and study plan clearly indicates the presence of NBS. This can be seen not only in the learning objectives, but also in the overall design of the study program and the content of study plan. In the books (teaching materials) specially prepared for these studies, there is an entire chapter devoted to NBS, which proves the importance of this concept in the curriculum. The four textbooks constitute a kind of compendium of knowledge on sustainable, smart and participatory urban development. They present the conditions, problems, challenges of the functioning of modern cities and allow to look at them from different perspectives: environmental, social, economic and institutional. Moreover, in the course of studying, various projects based on NBS are implemented. For example, an apiary was established on the university campus in 2021, consisting of five beehives and an apitherapy house. In this way the university reminds of the numerous benefits of beekeeping in urban areas. First of all, these insects pollinate urban plants, which enables the production of seeds and fruits, which in turn help maintain the bee population. In addition, an additional bee family has taken up residence in an apitherapy house - after taking a seat on the bench, you can listen to its buzzing, which has a positive effect on human well-being. This municipal apiary helps also in educating students in the field of EcoCity. More information: https://www.igp.uni.lodz.pl/kierunki-studiow/kierunek-ekomiasto
Responsible partner that collected the practice	PUK

Country of the best practice initiative	Poland
City of the best practice initiative	Warsaw, Krakow, Wroclaw

Field of study	Engineering, Social Sciences, Humanities, Business and Economics, Education
Institution	Three universities: AGH University of Science and Technology, the Warsaw School of Economics and the University of Wrocław
Level of study	Postgraduate Studies
Course	Postgraduate Studies Inter-university Academy of Climate (Polish: Studia Podyplomowe Międzyuczelniana Akademia Klimatu, MAK) is a unique initiative of three universities in Poland with significant support from the banking and business sectors, aimed at educating professionals who want to increase their knowledge about climate change and gain practical skills with this extremely important civilization challenge.
NBS category	Educational program on climate change

Topic of the best practice initiative	The Inter-University Climate Academy (MAK) postgraduate program covers the following topics: • The physical basis of climate change, • Biodiversity and its contemporary threats, • Technical aspects of climate change adaptation and mitigation, • Economic development and the natural environment, • Man, society and climate change, • International, regional and national legal aspects of climate change, • Diploma seminar. Postgraduate studies at the Intercollegiate Academy of Climate (MAK) enable the implementation of the following thematic paths: - engineering and energy (implemented by the AGH University of Science and Technology), - economics-finance-economy (implemented by the Warsaw School of Economics), - man, society, spatial management (implemented by the University of Wrocław). On the first of the mentioned paths, topics also covering NBS are implemented: - Ecological Engineering and Nature Based Solutions (NBS) - Advanced engineering and technical solutions for climate neutrality - Industry integration and cross-sectoral cooperation - Sustainable city management, integration of municipal management with business - Low-emission municipal economy and business Second path: economy - finance - economy* (implemented by the Warsaw School of Economics) includes: - Sustainable Finance - Social account of investment effectiveness - Managing relations with Stakeholders, taking into account ESG aspects - Sustainable banking - Economics of sustainable development - Sustainable urban development - ESG reporting - Energy transformation of the Polish economy - Training of responsible attitudes in socio-economic relations - EU climate policy - economic aspects The third path: Man, Society, Spatial Management (implemented by the University of Wrocław) includes:

	- City ecology - Geohazards and climate change - Paleoclimatology - understanding past and present climate changes - Spatial planning and urban planning in the context of climate change. Students choose one of the three study paths to be implemented in the second semester of classes.
Best practice objectives	The aim of the studies is to develop practical knowledge and skills in the field of: • causes of progressive climate change, • impacts and challenges related to climate change, • opportunities to counteract climate change, • the impact of climate change on the natural environment and the functioning of societies, economies, local government units, organizations and enterprises, • possibilities of adapting to climate change, • existing and planned regulations related to climate change at the national, regional and international level..
Best practice results/ Impact	Postgraduate studies prepare a team of professionals who will: • understand the ongoing climate change and its consequences, • have knowledge, skills and competences and, therefore, be able to undertake both counteracting initiatives and adaptive actions to climate change, • have the opportunity to develop valuable relationships with scientific and industry experts in the field of climate change.
Engaged stakeholders	The studies were created with significant support from the banking and business sectors: Bank Ochrony Środowiska Foundation (BOŚ Foundation), Biznes dla Klimatu Foundation and the Climate Education Foundation. Lecturers are experienced scientists, representatives of business and non-governmental organizations.

Pedagogical approach	The effect of the studies is obtaining comprehensive, interdisciplinary knowledge, developing a broader perspective, combining a comprehensive view with industry professionalism. This model of education will allow students to establish valuable cross-sectoral contacts or develop a common understanding of the issues discussed. Diploma theses of a complex and interdisciplinary nature, with an important practical aspect (approach - project and problem - oriented learning) will be a very important element of education as part of the study. A unique opportunity will be the implementation of diploma theses in interdisciplinary teams of several people, e.g. financiers, engineers and humanists, which will allow for in-depth analyses and practical cross-sector communication. Classes are organized online via the MS Teams platform.
Important considerations (if applicable)	As mentioned, the study program includes issues directly related to NBS (in the first path engineering and energy implemented by the AGH University of Science and Technology). However, the entire study program deals with the issue of climate change, so all paths refer to the NBS. More information: https://www.sgh.waw.pl/studia-podyplomowe-i-mba/zarzadzanie/miedzyuczelniana-akademia-klimatu and https://gazeta.sgh.waw.pl/wspolpraca-z-otoczeniem/agh-sgh-i-uniwersytet-wroclawski-tworza-miedzyuczelniana-akademie-klimatu
Responsible partner that collected the practice	PUK

Country of the best practice initiative	Poland
City of the best practice initiative	Rzeszów

Field of study	Business and Economics, management
Institution	University of Information Technology and Management in Rzeszów
Level of study	Bachelor, Master's
Course	project "The Visegrad Sustainable Living Labs Network 4 Youth of Universities" (VSLLN4YOU)
NBS category	mixed, different problems will be tackled
Topic of the best practice initiative	Sustainable Living Labs (SSLs) at UITM
Best practice objectives	The University of Information Technology and Management together with partners – universities from Hungary, Slovakia and the Czech Republic decided to use the potential, creativity and commitment of students and create a network of university living laboratories working for the green transformation of the university. Under The Visegrad Sustainable Living Labs Network 4 Youth of Universities (VSLLN4YOU) project they enable the co-creation and testing of innovative and sustainable solutions relevant to the universities of the Visegrad region, in cooperation with partners from the private, public and civil society sectors. The SLLs will engage students with real-world experience, working on sustainable projects and green solutions, and prepare them to be change agents in their personal and professional lives.

Best practice results/ Impact	They build a foundation of knowledge, create a space for cooperation and a path for the development of green competences of current and future students. As a result, knowledge is developed and a space for cooperation is created, as well as a path for the development of green competences of students. Living labs enable students to gain hands-on experience by working on sustainable development projects and prepare them to be agents of change in their personal and professional lives.
Engaged stakeholders	Students, educators from: University of Information Technology and Management in Rzeszow (leader) and partners: The University of Pécs, Czech University of Life Sciences Prague, The University of Presov

Pedagogical approach	Multi-method approach: Living Labs use multiple approaches, fitting in each different case, e.g. student-center methodology, participatory research, co-design methodology and finally simulation-based learning. In order to achieve the project goals, a bottom-up approach is applied by using living laboratories, i.e. interdisciplinary teams of employees/students/clients and consumers, creating innovative solutions - from diagnosis and analysis of user needs, through product and service designs responding to these needs to tests of developed solutions in a specially prepared creative space. Key issue are: user's engagement to be confirmed from the very beginning of the process; multi-stakeholder participation (impactful identification of relevant stakeholders) all the activities that take place during Living Labs process, take place in real-life settings, or imitation of them, in order for the community of users to gain overview and detailed context, The framework of a Living Lab is conceptualized beyond the top-down logic, engaging end users in the creation process, as equal contributors and co-creators of the educational process. The steps are as follows: 1) data collection and definition of the scope 2) co-designing of physical, economic or social interventions, 3) testing the idea/business model 4) launching and evaluating. Through SLLs, workshops, training materials, and conference, the project offers knowledge transfer for sustainable change.

Important considerations (if applicable)	Visegrad Sustainable Living Labs Network 4 Youth of Universities – project summary is available on the website: https://wsiz.edu.pl/vslln4you/ In the international UI GreenMetric index, the University of Information Technology and Management in Rzeszów is ranked on second place among Polish universities in 2022. https://wsiz.edu.pl/wp-content/uploads/2022/12/WSIiZ-UI-Green-Metric.pdf In 2022, the university took 291 place in the global ranking of the Most Sustainable Universities (second place in Poland). The results of the analyses carried out as part of the evaluation and certification process indicate that the University cares about the implementation of solutions in the area of sustainable development - in the area of infrastructure, energy and climate change management, waste and water management, transport and education.
Responsible partner that collected the practice	PUK

Country of the best practice initiative	Poland
City of the best practice initiative	Wroclaw
Field of study	Engineering
Institution	Wrocław University of Environmental and Life Sciences
Level of study	Bachelor

Course	Stone in architecture
NBS category	Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)
Topic of the best practice initiative	Using natural material for architecture, finding new creative ways to use stone for construction, using the potential of natural materials
Best practice objectives	The subject introduces students to the use of stone, starting with the explanation geological rock-forming processes. The methods of obtaining and processing stone for the construction of architectural details and objects are also explained small architecture. Ways of using stone elements in architecture are presented with particular emphasis attention to the use of stone in interiors. The causes of chemical and microbiological destruction of stone products and methods are presented maintenance and prevention of such processes.
Best practice results/ Impact	As part of the course, students will receive knowledge in the field of development-related issues technological, interactive spaces and innovative trends in interior design. On the basis of knowledge in the field elements of space development, they will be able to solve selected complex design problems on landscape architecture projects using stone. Students will also gain knowledge about the physical properties of stone as an energy-storing, durable and aesthetic material. The course "stone in architecture" promotes stone as a building material and the result is to encourage more frequent use of it in architectural projects.
Engaged stakeholders	Students, educators. Potential stakeholders: architectural offices, interior designers

Pedagogical approach	As part of the project implemented in class, the student will have the opportunity to think independently and creatively formulating the problem taking into account the needs social and environmental. 1. Students will perform the following activities: 2. Individual work in the field: Detailed inventory of the selected area. 3. Analysis of the study area in terms of the surroundings, surface and small architecture, as well as availability and potential users - consultations 4. Similar solutions along with your own assessment and thematic inspirations - presentation. 5. Design activities: The concept of developing the selected interior in terms of paving and small architecture - clause and discussion of the preliminary concepts.
Important considerations (if applicable)	The field of study includes more NBS subjects. One of them has been described. The entire study program is available (in Polish): https://bip.upwr.edu.pl/download/VGBUXLgBQLmg8VFZiSlIDWwxEQ2pgTx8HCioTVTkeHm9ZFUJpSBs_RTpaETscPFgHFkhRfm5BTxIIlgRuDxNYd0EOSHxcG2MVOF8QPQRBC0FwFwArPgQdFgAqD3cPGx9vTxUKKhZcIUMKWRB6UkEJQRhQAC0-GwQBDGdbEwAFFSMXFVZpFFg7X3cKVj4BD1QQaF0DOiMHCAEdNj0eUCtVPQ9rVS8BSixFPEAAMQcNbUwNQERwEEJfVjVqVW1JVVZvBV4WLkYDbU00XBU7Eg1YCGscARd9MkA9CDcCWQ8DHyYXQggqO1I9Vj9fFioJGUQ8RwYGLCUMMhEdJAJbCRkbPw1SJTsNXD1AJkoRPwc8QhdbAh0hLTICPRk3DlcPGw8SDFAVJwpWLlw0VBE1AQBaCllcAywqT0FABSQPVkRNWD0PFQc/zalacznik_nr_1_-_architektura_krajobrazu_studia_stacjonarne_pierwszego_stopnia_o_profilu_ogolnoakademickim.pdf
Responsible partner that collected the practice	PUK

Country of the best practice initiative	Poland
City of the best practice initiative	Rzeszów
Field of study	Social Economy
Institution	Wyższa Szkoła Informatyki i Zarządzania w Rzeszowie (University of Information Technology and Management in Rzeszów
Level of study	postgraduate study
Course	Social economy manager
NBS category	Business social responsibility
Topic of the best practice initiative	Sustainable Development of the University of Information Technology and Management in Rzeszow
Best practice objectives	Action to combat climate change and its effects
Best practice results/ Impact	The University is checking air quality together with BorgWarner Poland sp. z o. o.
Engaged stakeholders	Educators, students, Company: BorgWarner Poland sp. z o. o. (manufacture of other parts and accessories for motor vehicles).
Pedagogical approach	civic ecology education, action competence learning

Important considerations (if applicable)	reduction of CO2 emission
Responsible partner that collected the practice	RRDA

Country of the best practice initiative	Poland
City of the best practice initiative	Cracow
Field of study	Natural Sciences, Engineering, Arts and Design
Institution	Cracow University of Technology
Level of study	Bachelor, Master's, explanation of the level of studies - these are technical, engineering studies: 1st degree engineering studies (7-semesters) and 2nd degree masters (3-semesters)
Course	Landscape Architecture
NBS category	Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...), studies on landscape architecture, in line with the idea of sustainable development, green economy and environmental protection

Topic of the best practice initiative	By its interdisciplinary nature firmly embedded in environmental conditions, it becomes the only appropriate approach to climate change and the deficits associated with the aggressive development of recent decades. This way of design is ideally suited to the current needs of shaping space. The program is complemented by activities such as active use of ecosystems, sustainable design, strengthening and utilizing green and blue infrastructure, or applying the 3R principle - Reduce, Reuse, Recycle. A wealth of experience in park design, revaluation of historic gardens, adaptation of post-industrial and post-military sites, urban planning, design of protected areas is also an asset. It is the only Landscape Architecture study programme in Poland accredited by IFLA Europe - International Federation of Landscape Architects. This means that the curriculum meets European standards, and the competencies of graduates are recognized in Europe and around the world.
Best practice objectives	Landscape architecture is interdisciplinary in its nature. It combines engineering, artistic and environmental knowledge. The way of designing based on complex knowledge requires the use of appropriate methods developed on scientific and practical grounds. The original methods of education are being developed, in which landscape is seen as a guideline, determinant and goal of design. With the development of the discipline, the way of education is evolving, enriched with new approaches, taking into account modern trends and technologies and developing methods of social research.
Best practice results/ Impact	According to the program of study, graduates have knowledge of natural, agricultural and fine arts technical sciences and the ability to use it in their professional work while observing legal and ethical principles. He has the ability to shape landscape architecture in accordance with the utilitarian, psychological and biological needs of humans. Graduates are also able to apply environmentally friendly solutions and reverse the effects of environmental degradation, contributing to better use of existing natural resources.

Engaged stakeholders	The study program envisages enriching the didactic process with collaborative contact with specialists and knowledge at the global level. It assumes active cooperation with practitioners working in the public, private and social sectors. The academic staff are not only specialists in their scientific dissertation, designers and excellent didacticians, but also people, committed to their work and to the quality of landscape, cultural and natural heritage. Within the framework of the studies, there is the possibility of professional practice in public institutions such as the Board of Urban Greenery in Cracow, Polish and foreign companies, contractors and designers, or practice important for the future profession (such as dendrological and surveying practice), The study program lists a number of institutions with which cooperation is carried out.
Pedagogical approach	The study program involves a large number of intensive active classes related to landscape design blended learning techniques and modern computer software to increase the efficiency and effectiveness of education. Diverse didactic methods are used in the educational process, among which are both traditional (giving) methods and modern, interactive methods that activate the student into action. Among the pedagogical approaches used are place-based learning, problem-based learning, action competence learning.
Important considerations (if applicable)	The motto of the didactic work conducted in the course of landscape architecture at the Cracow University of Technology is the definition of the specialty formulated by Harvard University President Charles William Eliot (1834-1926): "Landscape architecture is first and foremost an art, and its most important function is to create and preserve beauty in the surroundings of human habitation and more broadly in the natural scenery of the country." It is the only Landscape Architecture study programme in Poland accredited by IFLA Europe - International Federation of Landscape Architects.
Responsible partner that collected the practice	RRDA

Country of the best practice initiative	Poland
City of the best practice initiative	Wrocław
Field of study	Engineering, Environmental engineering, mining and energy
Institution	University of Natural Sciences in Wroclaw and Wroclaw University of Technology
Level of study	Bachelor, explanation of studies - these are engineering studies: First-cycle (engineer) programme
Course	Bioeconomy
NBS category	circular economy, systems bio-renewables, bioproducts, bioreactors and biorefineries, chemistry and bioorganic chemistry, biotransformation, process engineering.

Topic of the best practice initiative	According to the program of study, a graduate of the 1st degree studies in Bioeconomy has advanced knowledge in circular economy, bio renewable systems, bioproducts, bioreactors, and biorefineries, chemistry and bioorganic chemistry, biotransformation, microbiology, and process engineering. The graduate knows the graphic and computer design techniques and is able to use the GIS tools that are applied in bioeconomy. He/she is able to select the appropriate materials and equipment for the technologies used in bioeconomy. The graduate also possesses basic knowledge and skills related to the processing of raw materials of animal and plant origin and modern analytical methods used in bioeconomy. He/she is project-oriented and is able to work in a team. The graduate knows the principles of the protection of intellectual property and is able to start an enterprise. He/she possesses the knowledge related to bioeconomy, rational use of environmental resources, engineering in bioproduction, process engineering, environmental engineering, the logistics of the supply chain, and economy in the New Green Deal. The graduate is well prepared to establish and manage companies and to take up employment in the Bio-Based Industry sector, in newly created enterprises (including their own), which operate in the widely understood sustainable economy, in consulting and educational companies in the bioeconomy sector, in analytical, research, and diagnostic laboratories, in national and local public administration, in NGOs that operate in the bioeconomy sector and generate related knowledge in this area, in enterprises that deal with the manufacturing, transport, and distribution of bioproducts. The graduate may apply to enrol in 2nd degree studies, and start a postgraduate studies programme.

Best practice objectives	● Acquired an understanding of the field of biology, chemistry, microbiology and related sciences useful for understanding and interpreting processes related to the bioeconomy; ● Acquired an understanding of the field of water and sewage management, waste management and non-waste management; ● Acquired an understanding of the field of key issues in the field of environmental protection, including the sustainable use of natural resources; ● Acquired an understanding of the field of the issues of biotransformation, biorefining, bioconversion and the use of biomass and by products in the bioeconomy; ● Acquired an understanding of the field of meteorology and climatology, protection and pollution of the atmosphere; ● Understand the meteorology and climatology, protection and pollution of the atmosphere; ● Acquired an understanding of the field of the principles, methods and technologies of environmental monitoring, adaptation to climate change, the principles of sustainable development and product life cycle assessment.
Best practice results/ Impact	According to the program of study, graduates have knowledge of circular economy and bioeconomy in theory and use the information gained in practice. The aim of the studies is to educate high-class specialists thinking of working in the broadly defined bioeconomy. During the course of study, the student will receive knowledge of both economics and business management. Knowledge of bioproduct and food and biomass processing will enable bioeconomy graduates to properly design processes and select equipment. Students will also be equipped with knowledge that prepares them for independent business, including the creation of start-ups. The knowledge and practical skills gained in the agribusiness major will allow graduates both to run their own businesses and to hold senior positions in bioindustry and biorefinery-related enterprises, as well as in analytical, research and diagnostic laboratories, and in enterprises involved in the production, storage, transportation and distribution of bioproducts. The studies are conducted entirely in English which allows study for foreigners and ensures internationality of studies.

Engaged stakeholders	- Wroclaw University of Life Sciences, - Wroclaw University of Technology, - manufacturing companies, institutions, and laboratories connected with the Bio-Based Industry sector in Poland (these are the institutions involved in conducting a 4-week internship for 6th semester students).
Pedagogical approach	Blended learning: Lectures, workshops, laboratory classes, presentation, report preparation, participation in discussions. The course will adopt diverse teaching techniques, engaging mentors and lecturers from the business and academia. It will be composed of blended learning with daily online lectures and exercises, discussions and group work together with mentors. The study program is also complemented by a 4-week internship in manufacturing plants, institutions and laboratories related to the Bio-Based Industry. The purpose of the internship is to familiarize students with all issues related to the production and operation of plants using the principles of bioeconomy or the activities of institutions and laboratories related to industries using bioeconomy principles or local government institutions.
Important considerations (if applicable)	This is a new field of study opened for the first time in the academic year 2022/2023. Bioeconomy is the first joint major implemented by Wroclaw University of Life Sciences and Wroclaw University of Technology.
Responsible partner that collected the practice	RRDA

Country of the best practice initiative	Poland
City of the best practice initiative	Warszawa

Field of study	Natural Sciences
Institution	University of Warsaw, Faculty of Geography and Regional Studies
Level of study	Master's
Course	Strategic management in local government for sustainable development
NBS category	Governance in local government in the context of sustainable development, waste management, Europe's Green Deal, environmental adaptation strategy
Topic of the best practice initiative	Studying Spatial Management serves to acquire detailed knowledge and skills in the functioning of different types of spatial structures; the processes constituting different types of functional areas (urban, rural, tourist, industrial) and the relationship between them; the construction and development of social ties and their spatial manifestation (including knowledge of social capital); the norms and rules governing socio-economic and spatial development policies at all levels of management; the creation and development of individual entrepreneurship. Course Strategic management in local government for sustainable development is the first of its kind to be implemented for students in the 2023/2024 academic year. The goal is to present the knowledge of NBS at the local-government level. There will be subjects on the European Green Deal, sustainable development, waste management, sustainable use of common resources in local government. This study responds to the need for education in the field of sustainable development.

Best practice objectives	The main goal of the course Strategic management in local government for sustainable development is to educate professionals prepared to manage local governments in accordance with the idea of sustainable development, green economy and environmental protection.
Best practice results/ Impact	According to the study program, graduates will gain the ability to manage in local government in accordance with the idea of sustainable development, Green governance. They will act in understanding the interrelationship between economic, social and environmental aspects and local policies in various spheres. Graduates will be able to apply environmentally friendly solutions and reverse the effects of environmental degradation, contributing to better use of existing local natural resources and improving the natural potential of the local government.
Engaged stakeholders	- University of Warsaw, - A distinctive feature of these studies, is the combination of didactics with scientific research and the participation of students in research projects carried out at the faculty.
Pedagogical approach	The study program involves a large number of active activities, as well as a clear link between scientific research and the educational content provided. The program assumes the use of blended learning techniques and modern computer software to increase the efficiency and effectiveness of education. Diverse didactic methods are used in the educational process, among which are both traditional (giving) methods and modern, interactive methods that activate the student into action. Among the pedagogical approaches used are place-based learning, problem-based learning, civic ecology education, action competence learning, community service learning, participatory action research. The basic forms of classes are: lectures, exercises, laboratories, as well as proseminars, seminars and conversation classes. The specificity of the study is determined by field classes.

Important considerations (if applicable)	Course Strategic management in local government for sustainable development is the first of its kind to be implemented for students in the 2023/2024 academic year.
Responsible partner that collected the practice	RRDA

e. Annex Portugal

Country of the best practice initiative	Portugal
City of the best practice initiative	Lisbon
Field of study	Natural Sciences, Engineering
Institution	FCUL- Faculty of Sciences of the University of Lisbon
Level of study	Bachelor, Master's, PhD, Posdoctoral, Teaching and Research Staff
Course	HortaFCUL & Permalab

NBS category	Sustainable waste management (e.g. waste reduction and recycling programs, composting programs/upcycling programs,...), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)
Topic of the best practice initiative	Permaculture
Best practice objectives	-to compost organic waste and turn it into a priceless resource for urban gardening to rejuvenate and make the city's soil more fertile; -to increase the diversity of all life forms while promoting biodiversity by developing ecosystems that resemble natural patterns and are both practical and fruitful for humans; -to create social structures and tools that promote a sense of community and belonging among the project's participants and enable successful communication, decision-making, and cooperation; -To create inviting venues for social gatherings and the participation of the Faculty's community and outside members while also offering chances for informal teaching and scientific demonstration in regenerative agriculture and permaculture; -to encourage regenerative social activities, local trash management, and the reduction of carbon emissions and the campus' ecological imprint; -based on the permaculture ideals, concepts, methods, techniques, and tools suggested, increase awareness and show more ecological behaviours.

Best practice results/ Impact	The HortaFCUL PermaLab project has produced a number of best practice outcomes and impacts, including: -Testing cutting-edge permaculture strategies: The project offers a location on campus for testing and putting into practice permaculture strategies that are systemically planned and based on ecological principles. This strategy guarantees that the solutions are efficient and long-lasting. -PermaLab establishes a setting where researchers, students, and community people can work together on projects that address real-world issues. This atmosphere is transdisciplinary and transformative. The answers are thorough and practical thanks to the transdisciplinary approach. -Partnerships between the institution, the local government, and neighborhood organizations are part of the project. With this strategy, it is ensured that the solutions have a stronger impact and are pertinent to the community. -Regeneration of the university campus: Through establishing green areas, enhancing biodiversity, and lowering trash, PermaLab helps to regenerate the university campus. These initiatives promote sustainable behaviors and improve the campus environment. -The purpose of PermaLab is to assess and produce scientific proof of nature-based solutions. This strategy guarantees that the answers are supported by data and are replicable in other situations. -Ultimately, the HortaFCUL PermaLab project shows how permaculture can be applied to develop practical, long-lasting solutions to challenges. The initiative is a best practice example for other colleges and communities to imitate because of its creative methodology, partnerships, and emphasis on empirical evidence.
Engaged stakeholders	Educators, students, staff, employers
Pedagogical approach	This project's educational strategy appears to be a synthesis of numerous techniques, including problem-based learning, community service learning, place-based learning, and participatory action research.

Important considerations (if applicable)	n.a.
Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal
City of the best practice initiative	Aveiro
Field of study	Social Sciences, Law and Politics
Institution	University of Aveiro
Level of study	Bachelor
Course	Environmental Sustainability
NBS category	Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...)

Topic of the best practice initiative	PART I: The complex concept of Environmental Sustainability 1.1. environmental sustainability within the framework of sustainable development The Ecological Footprint and the assessment of sustainability through indicators 1.3. 1.3. the evolution of the international political agenda and the 2030 Agenda 1.4. The current challenges and the Planet's Limits PART II: Environmental problems, challenges and risks for territories and organizations 2.1. Climate Change: Adaptation and mitigation 2.2. Healthy and Sustainable Food Systems 2.3. 2.3. Energy and Transport 2.4. 2.4. Ecosystem Services, Green Infrastructure and nature-based solutions 2.5. Air, Water and Waste
Best practice objectives	In the context of sustainable development and the United Nations Agenda 2030, the environmental sustainability course focuses on educating students about environmental challenges. In addition, the course addresses organizational management, territorial planning, and environmental sustainability challenges. Students will develop their understanding of and ability to debate environmental issues by learning about the interactions between environmental factors and concerns relating to the economy, society, culture, and human health. The goal of the course is to give students the skills and information necessary to constructively impact society as future professionals.

Best practice results/ Impact	The goal of the course is for students to comprehend the historical connection between environmental preservation and sustainable development. Students will gain knowledge of how to recognize and evaluate the difficulties, dangers, and hazards related to current and foreseeable environmental sustainability issues. As part of territorial planning and institutional management, the course also seeks to impart theoretical and empirical knowledge on the procedures for developing public policies for environmental sustainability.
Engaged stakeholders	Educators, students, consortium of ERASMUS + EUSTEPs project
Pedagogical approach	Team projects and problem-based learning are used in the Environmental Sustainability course to create a dynamic learning environment that includes both theoretical and applied knowledge. To accomplish this, the course will make use of fresh methods and resources for teaching and learning. The ERASMUS + EUSTEPs project, which assesses ecological footprint to enhance sustainability teaching approaches at four European universities, includes this course. Participatory action research and socio-scientific inquiry-based learning are also included in the course.
Important considerations (if applicable)	website of the project: https://www.eusteps.eu/ For those pursuing a Bachelor's in Public Administration (1st cycle), completion of the course is required.
Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal

City of the best practice initiative	Lisbon
Field of study	Natural Sciences, Engineering
Institution	Instituto Superior Técnico- University of Lisbon
Level of study	Master's
Course	Nature Based Solutions in the Urban Water Cycle
NBS category	Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)
Topic of the best practice initiative	The difficulties in managing water in an urban setting are described in the introduction. Different nomenclatures and the history of nature-based solutions for managing water in cities. Characteristics of nature-based solutions for effective water cycle management in urban settings. solutions for reducing water flow and enhancing water quality. the connection to the city and the interface between water management and natural processes (blue and green infrastructure). Ecosystem services are introduced in Nature-Based Solutions for managing urban water. a comparison of the costs and benefits of natural solutions. Presentation of case studies highlighting various applications.

Best practice objectives	By the end of the course, students will be able to: describe how green infrastructure relates to water in urban areas; recognize the characteristics of nature-based solutions used in urban settings; talk about the potential advantages of nature-based solutions for managing urban water quality and quantity; list the benefits of nature-based solutions in urban environments; and assess the costs and advantages of using nature-based solutions in urban settings.
Best practice results/ Impact	This course emphasises the development of soft skills, such as information and media literacy, creative and critical thinking, and interpersonal and intrapersonal skills. By including these abilities in the evaluation procedure, students are encouraged to actively work on acquiring them, resulting in more fulfilling learning opportunities and even higher levels of engagement. Furthermore, the course material's focus on Nature-Based Solutions (NBS) for urban water management presents a significant opportunity for students to learn more about this crucial subject. Students can learn how to support urban water management and deal with challenges in water management through the history and terminology of NBS. Case studies demonstrating NBS's many advantages and their cost-benefit analyses in urban settings are also included, giving readers a thorough understanding of NBS. Overall, the course can give students the knowledge and abilities to advocate for more environmentally friendly approaches to urban water management.
Engaged stakeholders	Educators and students
Pedagogical approach	Students are expected to develop critical and creative thinking abilities through group projects and exams, which suggests that this course's pedagogical approach blends problem-based learning and participatory action research. The development of interpersonal and intrapersonal skills, including teamwork, self-discipline, enthusiasm, and perseverance, is another focus of the course. The ability to find and evaluate media content is also highlighted, along with information and media literacy skills. An estimated 20% of the course's assessment will be based on these skills.

Important considerations (if applicable)	This is a free options course for a Bologna Master Degree in Environmental Engineering, with a weight of 6 credits.
Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal
City of the best practice initiative	Coimbra
Field of study	architecture
Institution	University of Coimbra
Level of study	Master's
Course	Health, Sustainability and Planning
NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...)

Topic of the best practice initiative	-Health, sustainability, and planning are reconciled through participatory science and interdisciplinary knowledge translation. -Ecosystem services provided by urban forestry and planning are essential for biodiversity conservation, human health, and well-being. -Green (edible) infrastructure creates new city dynamics that enhance ecosystem services and human health. -Solutions derived from nature for the creation of novel planning dynamics promoting sustainability and human welfare.
Best practice objectives	The course unit's objectives are derived from the discussion of programs, practices, and policies that address the cross-cutting issues of planning for improved population health, sustainability, and well-being from an integrated and inclusive perspective. O.1 Recognize the value of interdisciplinarity in planning, particularly from the perspective of indicators of biodiversity, health, and human well-being. O.2 Develop interdisciplinary and participatory science planning skills for sustainable and healthy city planning. O.3 To test interdisciplinary assessment plans and participatory methodologies in planning. O.4 Be familiar with the ideas of sustainable urbanism, edible green infrastructure, food sustainability in cities, and nature-based solutions.
Best practice results/ Impact	It might result in better comprehension and application of sustainable urban planning techniques. The preservation of biodiversity, human health, and urban well-being may all benefit from this.
Engaged stakeholders	Educators and students

Pedagogical approach	The main component of the pedagogical strategy is the presentation and discussion of a number of development topics from the course unit's syllabus while encouraging student participation and offering the option for individual contributions. The pedagogical work is developed based on a previously decided plan, ensuring that the topics chosen are relevant to the technical-scientific, professional, and dissertation/report project interests of the students.
Important considerations (if applicable)	This is an optional course in the 2nd year of the Master in Integrated Urban Rehabilitation, weighing six credits.
Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal
City of the best practice initiative	Porto
Field of study	Engineering, biotechnology
Institution	Catholic School of Biotechnology
Level of study	Bachelor
Course	Resources and Sustainability

NBS category	Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Sustainable waste management (e.g. waste reduction and recycling programs, composting programs/upcycling programs,...), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...)
Topic of the best practice initiative	-Environmental issues of current concern: global warming and climate change, ozone layer depletion, soil degradation and loss of wetlands and agricultural land, species extinction and contamination, resource depletion and degradation -Impact of industrial activity on the environment: ecological footprint, carbon footprint, water footprint, energy footprint -Principles of industrial ecology and nature-based solutions -Principles of circular design and application in different sectors along the production chain: technological opportunities and constraints -The concept of biorefineries in a circular economy approach: raw materials and products -Environmental assessment tools -Resource management and the LEAN methodology -Environmental performance reporting - Sustainability reporting
Best practice objectives	Learn the fundamentals of ecological design for product development, recognise environmental concerns resulting from human activities and industrial processes, analyse the environmental impact of products and technological processes, such as water usage, waste generation, and energy inputs and outputs, based on an understanding of environmental processes, and acquire knowledge.

Best practice results/ Impact	Give students the knowledge and abilities they need to comprehend and deal with environmental problems and difficulties by managing natural resources and industrial processes. Students should have a more vital awareness of environmental issues, environmental evaluation techniques, and the circular economy idea by the end of the course, among other things. The course also incorporates field trips and seminars to give students experience with real-world applications and practical knowledge. The system's effectiveness will ultimately depend on how successfully students can use the information and abilities they gain to solve environmental problems and develop sustainable solutions in their future employment.
Engaged stakeholders	The engaged stakeholders for this course may include educators who teach the course, students who enrol, and professionals from diverse industrial sectors and research and development fields invited to lead seminars and provide practical insights on the course topics.
Pedagogical approach	The course is designed to incorporate various teaching methodologies, including lectures, tutorials, seminars, and field visits. Lectures cover different topics related to the course and provide an opportunity for students to discuss and engage with the material. At the start of the semester, students form groups of 2-3 and select a topic to explore in depth during tutorials, culminating in a final presentation to the entire class. To provide practical and real-world insights, specialists from diverse industrial sectors and research and development fields are invited to lead seminars, which focus on the applied aspects of the course. The course also includes two field visits to different organizations, where students learn about the LEAN methodology and Sustainability reports, with an emphasis on the efficient utilization of resources and the measurement of environmental impact.

Important considerations (if applicable)	The Degree in Bioengineering is a three-year course (180 ECTS) with three optional specialisations: Food Engineering, Environmental Engineering, and Biomedical Engineering. Any of them enables graduates to transition to professional life or a master's (at ESB, a master's in bioengineering lasts four semesters). This course is mandatory for the ones that choose environmental engineering. It is a three credits course.
Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal
City of the best practice initiative	Lisbon
Field of study	Social Sciences, Humanities
Institution	NOVA School of Social Sciences and Humanities
Level of study	Master's
Course	Environmental Planning-Greenways, Green infrastructures and Urban Greenspaces

NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)
Topic of the best practice initiative	-The study of urban planning and landscape ecology. A study of urban areas. - Environmental and urban planning. Urban Biophysical Space Analysis (Theory, Methodologies, and Techniques. -Definition of territorial carrying capacities, abilities, skills, and suitable applications. Climatology in cities. Geomorphology of cities. -Morphology of the urban landscape: trends in urban form and how they affect the surrounding ecosystem. -Green infrastructures, Greenways, and Urban Greenspaces. -Green infrastructures and greenways as sustainable urban structures. The systems of greenways and public spaces. -The creation of green spaces. The advantages of natural areas. Plan for going green. Examples. -Forestation and vegetation in cities. Effects of urban vegetation and afforestation. Urban Forest. -Restoration of urban ecosystems and the environment.
Best practice objectives	The goal of the field of territorial integration and synthesis is to give students the ideas, skills, and strategies they need to coordinate their actions with those of the urban ecology, environment, and landscape. The ultimate objective is to enable students to analyse and comprehend the dynamics, structure, and operation of the urban environment, landscape, and ecology. The field also aims to give future professionals thorough training that will enable them to join and work with interdisciplinary teams involved in urbanism and spatial planning. To help create a more liveable urban environment, these experts must promote more sustainable urban planning techniques.

Best practice results/ Impact	Students gain a thorough understanding of the urban environment, landscape, and ecology through the Environmental Planning course on Greenways, Green infrastructures, and Urban Greenspaces, which aims to facilitate more sustainable urban planning. The course emphasizes the development of critical thinking, research, and teamwork skills while utilizing problem-based learning. In order to create a more sustainable and healthy urban environment, it also encourages the development of green spaces, afforestation, and the restoration of urban ecosystems. For more effective learning outcomes and to better prepare students for careers in urbanism and spatial planning, the course uses a blended learning approach. A better understanding of sustainable urban planning, the development of analytical skills, and the improvement of a more sustainable and healthier urban environment are just a few of the positive effects of the course overall.
Engaged stakeholders	Educators and students.
Pedagogical approach	Problem-based learning, a student-centred instructional strategy that emphasizes solving real-world problems, is the pedagogical strategy used in the course. The aforementioned evaluation strategy, which incorporates hands-on activities, group projects, academic papers, attendance, and performance, is in line with the problem-based learning paradigm. This method promotes students' development of critical thinking, teamwork, and research skills—qualities that are crucial for future professionals working in urbanism and spatial planning. A blended learning strategy, which combines in-person instruction with technologically enhanced learning opportunities, is also suggested by the inclusion of an online learning platform. Overall, it appears that the pedagogical strategy employed in the course is successful in encouraging active and engaged learning, facilitating the acquisition of necessary knowledge and skills, and preparing students for their roles as professionals in urbanism and spatial planning in the future.
Important considerations (if applicable)	This course is a compulsory component of the Masters in Sustainable Urbanism and Spatial Planning, and carries a weightage of 6 credits.

Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal
City of the best practice initiative	Coimbra
Field of study	Natural Sciences, Engineering, Social Sciences, Humanities, Business and Economics, Education, Health Sciences, Law and Politics, Arts and Design
Institution	University of Coimbra
Level of study	Bachelor
Course	UC.Plantas- Knowing how to Plant the Future
NBS category	Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)

Topic of the best practice initiative	The Coimbra University Botanical Garden (JBUC) runs the UC.Plantas initiative every year, giving out 300 native plants, trees, and shrubs to University of Coimbra first-year students. The objective is to increase student awareness of the value of protecting the region's native flora and to advance biodiversity and sustainable development.
Best practice objectives	The UC.Plantas initiative's main goal is to educate first-year students about the need to preserve the region's native flora and to advance biodiversity and sustainable development. Additionally, the program hopes to motivate students to attend workshops and lectures on the subjects of biodiversity, conservation, and sustainable development. Students can participate in reforestation projects in cooperation with the Institute for Nature Conservation and Forests (ICNF) by taking care of their plants and monitoring their growth and development.
Best practice results/ Impact	The UC.Plantas initiative has been effective in raising first-year students' awareness of the value of protecting the native flora of the region and fostering biodiversity and sustainable development. Students have been encouraged to attend workshops and lectures as part of the program, allowing them to learn more about sustainability and conservation. Additionally, the project has helped reforestation efforts in cooperation with the ICNF.
Engaged stakeholders	The First-year University of Coimbra students interested in participating in the program are the initiative's main stakeholders. The Coimbra University Botanical Garden, the Institute for Nature Conservation and Forests (ICNF), the Associaço Académica de Coimbra student organisations, and the UNESCO Chair in Biodiversity and Conservation for Sustainable Development at the UC all provide additional support for the program.

Pedagogical approach	The UC.Plantas initiative employs a pedagogical strategy that involves providing first-year students with native plants, trees, and shrubs and encouraging them to take care of their plants. Students have the chance to take part in workshops and lectures on the topics of conservation, biodiversity, and sustainable development through the program. By involving students in practical environmental sustainability activities, the initiative hopes to encourage active learning. Students can learn about plant growth and development and contribute to reforestation efforts in partnership with the ICNF by taking care of their plants.
Important considerations (if applicable)	This is not a course, but I consider it a good practice since it is an exciting project involving students and NBS.
Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal
City of the best practice initiative	Almada
Field of study	Engineering
Institution	NOVA School of Science and Technology
Level of study	Bachelor
Course	Sustainable Urban Systems

NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus)
Topic of the best practice initiative	1. Systems' approach to urban systems; components and agents. Multiple scales (building, district, city, metropolitan area, peri-urban systems). 2. Cities: impact on sustainability and climate change. Competitiveness of cities. 3. Urban ecology: resource flows and stocks, urban biodiversity (from natural ecosystems to socio-ecological systems). 4. Green infrastructure and solutions based on nature: Natural Capital and the sustainability of cities; ecologically based management and urban ecological structure, Green Infrastructures (definitions, functions, types and services), 5. Circular technological solutions and Smart Cities: Urban water, energy and food cycle, mobility, 6. Integrated methodologies and tools: Superblock's Model. Urban Metabolism, Supply Chain Analysis. Ecological footprint of cities. Sustainability indicators. 7. Final workshop to present students' work
Best practice objectives	It aims to integrate knowledge applied to urban systems and their effects on global sustainability and climate change, as well as in enhancing national competitiveness. It aims to disseminate information and abilities about the complexity of urban systems, their technological and ecological components, and solutions based on ecological and circular economy models. The program aims to develop in students a capacity for critical and creative thinking, individual autonomy, teamwork, and integrated sustainability analysis tools. Additionally, it aims to promote the growth of autonomy and responsibility while strengthening analytical robustness.

Best practice results/ Impact	Developing skills in autonomy, responsibility, and robustness in the analysis; learning fundamental ideas and best practices for the development of project work throughout the course; consolidating knowledge in the present and the context of the project work; and thinking systemically about cities and their role in sustainability and climate change.
Engaged stakeholders	Students and educators
Pedagogical approach	The initiative's pedagogical strategy includes workshop-style expository classes in which students are invited to participate. Real-world examples are used to support practical classes that are also offered. A tutorial regime fosters the development of project-style work. The project is organized in accordance with the following principles: systems analysis, technical soundness, creative solutions, and impact on sustainability. To assess the development of written work and the clarity of oral presentations, standards have been established.
Important considerations (if applicable)	The course, which is not required, is part of the Environmental Systems Engineering Profile concentration in the third semester of the Master's program in Environmental Engineering. It carries a three-credit weight.
Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal
City of the best practice initiative	Lisbon

Field of study	Natural Sciences, Engineering
Institution	Faculty of Sciences of the University of Lisbon
Level of study	Teaching and Research Staff
Course	Green roof
NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...)
Topic of the best practice initiative	The installation and monitoring of a green-roof in a Higher Education Institution.

Best practice objectives	The project aims to install a green-roof using species that are adapted to the local climate, with the support of Galp, Neoturf Espaços Verdes and ZinCo. The objective is to contribute to a better understanding of the functioning and sustainability of these structures in Mediterranean areas. The green-roof provide multiple benefits, such as structural protection to the building, internal thermal isolation, external reduction of the heat-island effect, internal sound isolation, stormwater management and water retention, carbon sequestration, enhancement of biodiversity, and leisure areas. To ensure the success of the project, the evolution of the green-roof will be monitored regularly. This include monitoring plant survival, plant growth, vegetative and seed propagation. The green-roof is also maintained regularly to ensure its continued success.
Best practice results/ Impact	There are several advantages to installing a green roof made of a local climate-adapted species. These include the improvement of biodiversity, stormwater management, carbon sequestration, thermal isolation, sound isolation, and structural protection. The green roof also offers recreational spaces. A better understanding of the operation and sustainability of these buildings in Mediterranean regions is being made possible by the monitoring of the green roof. It is also offering important information on the development and accomplishment of the green roof installation. The success of the green roof is being ensured by routine maintenance, which is also giving volunteers, students, and researchers at CINCIAS educational opportunities.
Engaged stakeholders	Galp, Neoturf Espaços Verdes, ZinCo, volunteers, students, and researchers.

Pedagogical approach	Through routine maintenance and monitoring of the green-roof, the initiative's pedagogical approach aims to provide educational opportunities for volunteers, students, and researchers at CINCIAS. Additionally, it seeks to advance knowledge of these structures' sustainability and operation in Mediterranean regions so that it may be applied to further study and educational endeavors.
Important considerations (if applicable)	Installation date: 2013 Total area: 105m2 Plants installed: 1560 Number of species: 4 species of genus Sedum (Sedum/Petrosedum) The green-roof is located in the 3rd floor area between the buildings C4 and C5, and can be observed from the 3rd floor upwards of C1, C2 and C4 buildings.
Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal
City of the best practice initiative	Lisbon
Field of study	Natural Sciences, Engineering

Institution	Faculty of Sciences of the University of Lisbon
Level of study	PhD, Teaching and Research Staff
Course	FCULresta
NBS category	Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Sustainable waste management (e.g. waste reduction and recycling programs, composting programs/upcycling programs,...), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...), Air quality (e.g.: installation of air quality monitoring stations, development of educational programs on air quality, encouragement of alternative transportation methods), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)

Topic of the best practice initiative	FCULresta is an urban forest that is small but rich in biodiversity and functionality. Its purpose is to serve as a practical reference for a transdisciplinary approach that mobilizes society towards climate action, enhances urban biodiversity, and promotes the Sustainable Development Goals of the Faculty of Sciences of the University of Lisbon (Ciências ULisboa), as well as the city's designation as the Green Capital of Europe 2020. In addition to its practical and institutional support, FCULresta also aims to have a strong scientific component, contributing to a deeper understanding of the role of naturalized areas in an urban environment. The seed for this project was the European initiative 1Planet4All, which is a collaboration of 14 non-governmental organizations from around Europe, working in some of the world's most fragile countries directly affected by climate change. The VIDA project, coordinated by Portugal, is part of this more significant effort. The goal of 1Planet4All is to promote solidarity and interconnectedness through actions such as FCULresta, connecting the Global North and South and emphasising that climate change is a shared concern and problem.
Best practice objectives	The goals of FCULresta are to become a hands-on reference for a transdisciplinary approach towards climate action, enhance urban biodiversity, and contribute to the Sustainable Development Goals of the Faculty of Sciences of the University of Lisbon and its city as the Green Capital of Europe 2020. Additionally, FCULresta aims to have a solid scientific component that will contribute to a deeper understanding of naturalised areas' function in an urban environment. FCULresta will also act as a case study to evaluate the true potential of this method on climate action in the Mediterranean and other ecosystem services in the urban context, through different research questions that aim to look at the project as a whole.

Best practice results/ Impact	The FCULresta project, which involved the creation of a mini-forest in the Faculty of Sciences of the University of Lisbon, has yielded positive impacts and results. Two years after its implementation, the planted species has had a 75% survival rate, with myrtles growing exceptionally well. The project has also helped fix plants that were not produced and controlled the growth of exotic plants. As a result, the mini-forest has saved a significant amount of water - an estimated tens of thousands or even hundreds of litres of drinking water- compared to watering a lawn. The success of FCULresta has inspired more requests for help to plant Miyawaki forests in other areas, promoting the concept of urban mini-forests to enhance biodiversity in urban areas. Moreover, mini-forests have the potential to be used as places for teaching and learning, especially in schools. By combining biodiversity and community involvement, mini-forests can be effective environmental education and awareness tools. To this end, the project has created a guide to empowering school communities to develop, manage, and educate in these spaces, making a small but significant contribution towards promoting sustainability and environmental awareness. The FCULresta project has successfully demonstrated mini-forests' potential to conserve biodiversity, reduce water consumption, and promote environmental education and understanding. It has paved the way for more such projects to be undertaken in the future.

Pedagogical approach	FCULresta has a strong educational component, aiming to involve and educate young people in environmental issues and sustainability practices. The project mobilized 150 young people, mainly students, who participated in capacity-building actions and implemented the project for a week. This hands-on approach allows young people to learn by doing, while also fostering a sense of community and ownership over the project. In addition to the practical component, FCULresta also aims to have a strong scientific component, contributing to a deeper understanding of the function these naturalized areas can have in an urban environment. The scientific board of FCULresta brings together various areas and knowledge of Sciences ULisboa into the project, creating opportunities for reflection and enhancing synergies with other projects. Overall, FCULresta takes a transdisciplinary approach, seeking to mobilize society towards climate action, enhancement of urban biodiversity and other Sustainable Development Goals. Through its various networks and partnerships, the project engages a diverse range of stakeholders, including young people, universities, NGOs, private entities, and the general public.
Important considerations (if applicable)	https://ciencias.ulisboa.pt/en/fculresta#toc0
Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal
City of the best practice initiative	Lisbon and Algarve
Field of study	Natural Sciences, Social Sciences, Business and Economics, Social Economy
Institution	NOVA SBE: NOVA School of Business and Economics / Algarve University
Level of study	Bachelor
Course	OceanSchool
NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Sustainable water management (e.g. rainwater harvesting systems, permeable pavements and green roofs, water policies,...), Biodiversity management (e.g. creation of on-campus green spaces, implementation of green roofs and living walls, development of educational programs on biodiversity conservation and restoration ...)
Topic of the best practice initiative	Multidisciplinary education in ocean studies with a focus on economic and business aspects, in alignment with SDGs 4 and 14.

Best practice objectives	The OceanSchool is an innovative course stream in blue growth for master's students at NovaSBE and NHH, developed to address the lack of education programs in economics devoted to that topic. The program provides students with an interdisciplinary experience integrating knowledge from complementary fields, allowing them to develop economic and public policy analyses on maritime themes. The program includes a Field Lab for applied research projects and a summer intensive course focused on involved blue growth challenges. The three-year interdisciplinary course is a partnership between Universidade Nova de Lisboa and Universidade do Algarve and aims to provide students with a transversal vision of topics related to the ocean, enabling them to work in the private or public sector and support the design and consolidation of public policies in the ocean area. The course involves external partner entities and a faculty team core consisting of Assunção Cristas, Júlia Seixas, Antonieta Cunha e Sá, Regina Salvador, and Roberto Henrique.
Best practice results/ Impact	The program aims to create the first specialised breed of economists and practitioners on Blue Growth in Portugal, and the three-year interdisciplinary course is a world first. Overall, the OceanSchool program is a good practice that addresses the need for human capital in sustainable blue growth and provides students with the necessary competence and skills to work in the private or public sector and design and consolidate public policies in the ocean area.

Engaged stakeholders	The OceanSchool project involves a range of stakeholders, including: -Universities: The project is a partnership between the Nova School of Business and Economics (NovaSBE) in Portugal and the Norwegian School of Economics (NHH). The universities provide academic expertise and resources to develop the course curriculum and offer students access to faculty members with diverse backgrounds in environmental and resource economics, natural science, and policy analysis. -Non-academic institutions: The project also involves experienced practitioners and researchers from non-academic institutions such as the Portuguese Institute for Sea and Atmosphere (IPMA) to bring real-world perspectives on blue growth challenges and opportunities. -Students: The OceanSchool project aims to provide master's students at NovaSBE and NHH with an innovative educational experience that combines traditional learning goals with research on real-world challenges related to the blue economy. The students will be able to consolidate their knowledge on specific topics of blue growth and develop skills to apply economic and policy analysis to maritime themes. -Funders: The project is funded by the Mecanismo Financeiro do Espaço Económico Europeu (MFEEE/EEA-Grants) and the Portuguese Directorate-General for Maritime Policy (DGPM). These funding bodies support the development of a sustainable blue economy by investing in human capital and education programs in economics devoted to that topic. -Accreditation agencies: The project was approved to be submitted last November to the Agência de Avaliação e Acreditação do Ensino Superior, which is the Portuguese accreditation agency for higher education. This agency ensures that the educational program meets quality standards and prepares students for professional careers.

Pedagogical approach	The OceanSchool has adopted a multidisciplinary pedagogical approach that integrates knowledge from various fields such as environmental and resource economics, natural science, and public policy analysis. The program aims to provide students with a comprehensive understanding of blue growth from an economic perspective, while also allowing them to consolidate their knowledge through practical research projects and interdisciplinary challenges. The mandatory course work will provide students with a strong foundation in blue growth economics, while the Field Lab and summer intensive course will allow them to apply their knowledge to real-world challenges and develop skills in public policy analysis. The Field Lab provides a platform for students to work on applied research projects under the co-supervision of experienced researchers and practitioners, allowing them to produce new studies on relevant policy questions for Portugal and Norway. The summer intensive course will focus on applied blue growth challenges, benefiting from the participation of natural scientists and practitioners. Overall, the OceanSchool's pedagogical approach emphasizes the integration of theoretical knowledge and practical experience to provide students with the necessary competence and skills to develop economic and public policy analysis on maritime themes, delivering the first specialized breed of economists and practitioners on Blue Growth in Portugal.
Pedagogical approach	The programme incorporates a variety of pedagogical approaches, such as: Place-based learning: Utilizing the local ocean environment for hands-on learning experiences. Problem-based learning: Engaging students in solving real-world challenges in the ocean domain. Action competence learning: Fostering students' ability to take action and make informed decisions regarding ocean-related issues. Participatory action research: Involving students in research activities and collaborative problem-solving.

Important considerations (if applicable)	n.a.
Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal
City of the best practice initiative	Coimbra
Field of study	Natural Sciences, Engineering, Social Sciences, Humanities, Business and Economics, Education, Health Sciences, Law and Politics, Arts and Design, Social Economy
Institution	Department of Architecture of the University of Coimbra (DARQ-UC) and Centre for Social Studies (CES)
Level of study	Bachelor, Master's, PhD, Posdoctoral, Teaching and Research Staff
Course	The Healthy Home Summer School
NBS category	Climate change mitigation and adaptation (e.g. green campus initiatives, implementing energy-efficient technologies and renewable energy sources), Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)

Topic of the best practice initiative	Interdisciplinary summer school about NBS- Co-creation of an healthy corridor in Coimbra (Relvinha – Ingote – Bolão)
Best practice objectives	The Healthy Home Summer School is an interdisciplinary summer school that will be held in Eiras, the north district of Coimbra, Portugal, from July 6 to 12, 2023. The workshop aims to explore a healthy corridor for Coimbra by testing and improving the methodologies developed by the URBiNAT partners. Participants are challenged to develop processes and products that can transform the healthy corridor into a healthy home connecting Relvinha, Ingote, and Bolão social housing with Choupal natural park. Students, citizens, technicians, and local organizations are invited to attend studio activities, training sessions, visits to the intervention area and local associations, and conference with keynote speakers. The workshop is organized by the Department of Architecture of the University of Coimbra (DARQ-UC) and the Centro de Estudos Sociais (CES), in partnership with the Municipality of Coimbra, Casa da Esquina, and Cooperativa de Construção e Habitação Económica Semearrelvinhas
Best practice results/ Impact	As the Healthy Home Summer School is yet to take place, there are no best practice results or impact available at this time. However, the aim of the workshop is to explore and develop human and nature-based solutions for inclusive and innovative urban regeneration, with a focus on creating a healthy corridor connecting social housing neighbourhoods with natural parks in Coimbra, Portugal. The workshop will bring together students, citizens, technicians, and local organizations to co-create solutions and promote places that offer a better quality of life to the local communities. It is hoped that the outcomes of the workshop will contribute to promoting sustainable and healthy urban development practices that can be applied in other urban areas.
Engaged stakeholders	Coimbra City Council, Corner House, Semearrelvinhas Building and Affordable Housing Cooperative, Students (graduation, master, PhD) from all fields of knowledge, Municipal and governmental technicians, Citizens, members of associations

Pedagogical approach	The pedagogical approach of the Healthy Home Summer School is based on an interdisciplinary and participatory model of learning. The aim is to create an open and inclusive environment that fosters dialogue, cooperation, and co-creation among participants with different backgrounds, experiences, and perspectives. The program includes a combination of studio activities, training sessions, visits to the intervention area and local associations, and conferences with keynote speakers. Tutors are members of the URBiNAT project and experts from different fields who are invited to support the teams.
Important considerations (if applicable)	https://urbinat.eu/summer-school-2023/
Responsible partner that collected the practice	ZERO

Country of the best practice initiative	Portugal
City of the best practice initiative	Lisbon
Field of study	Natural Sciences, Engineering, Social Sciences, Business and Economics
Institution	Higher Institute of Agronomy- Lisbon University
Level of study	Bachelor, Master's, PhD, Posdoctoral, Teaching and Research Staff

Course	Urban Agriculture - Needs and Opportunities
NBS category	Urban regeneration (e.g.: implementation of parks and greenways, renovation and repurposing of old/underutilized buildings on campus,...)
Topic of the best practice initiative	Summer School on Urban Agriculture - Needs and Opportunities
Best practice objectives	The best practice objectives of this course are to: -Develop basic competencies in urban agriculture and agritecture for professionals or students involved in agricultural production, urban planning consultancy or architecture, in the public or private sector. -Contribute to the development of intelligent, resilient, and sustainable production systems, shortening agri-food circuits. -Stimulate entrepreneurship, innovation, and research in the area of urban agriculture and bio-inspired solutions. These objectives aim to provide a comprehensive understanding of urban agriculture, its challenges and potentials, and how nature-based solutions and agritecture can be used to overcome these challenges and create sustainable production systems. The course also aims to promote entrepreneurship, innovation, and research in this field, which is essential for the development of new and creative solutions to urban agriculture challenges.
Best practice results/ Impact	The course on Urban Agriculture and Agritecture aims to create basic competencies and stimulate entrepreneurship, innovation, and research in the field. It covers topics such as the challenges and potentials of agriculture in urban environments, nature-based solutions, and sustainable territorial food systems. The target audience includes technicians, researchers, architects, consultants, and university students interested in the topic. The course requires basic knowledge of agriculture, biology, or similar.
Engaged stakeholders	The stakeholders involved in urban agriculture and agritecture may include local governments and municipalities, urban planners and architects, farmers and growers, food producers and distributors,

	researchers and educators, community organizations, and citizens. The course aims to engage these stakeholders and provide them with the knowledge and skills necessary to develop intelligent, resilient, and sustainable production systems that address the challenges of feeding cities in a sustainable and efficient manner. By doing so, the course can help to stimulate entrepreneurship, innovation, and research in the field, as well as promote collaboration and partnerships between different stakeholders.
Pedagogical approach	The pedagogical approach of the course is based on a combination of theoretical lectures and practical exercises, with an emphasis on interdisciplinary and collaborative learning. The course also includes a field trip to showcase successful urban agriculture projects.
Important considerations (if applicable)	https://www.isa-opencampus.pt/agricultura_urbana#1199284221
Responsible partner that collected the practice	ZERO

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