



# Research Notes Letter

*Research & Innovation for a sustainable  
Baltic Sea Region*

Volume 4, Issue 1, 2021

Recent Research from  
BUP Participating Universities



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**The Baltic University  
Programme**



**This issue of the Research Notes Letter** contains 12 scientific abstracts on current research conducted at the BUP Participating Universities. The common denominator is the interest in a more sustainable development of the Baltic Sea Region. We want the Research Notes Letter to reflect the multi- and interdisciplinary science we believe is central to meet the Sustainable Development Goals indicated by the United Nations 2030 Agenda for Sustainable Development. All previous issues of the Research Notes Letter are possible to download from the web site.

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### **The Research Notes Letter in short**

We publish the Research Notes Letter three times per year and disseminate it in the network. The Research Notes Letter highlights abstracts on recent publications relating to the Baltic Sea Region and our ten BUP Themes. We promote research from our Participating Universities. The abstracts presented in the Research Notes Letter are accompanied by information on authors, information on their affiliation, abstracts, keywords and citation.

Editor,

Ulrika Jansson Klintberg

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# Enhancing oil spill response capacities in the South Baltic Sea region via cross-border utilization of biodegradable oil binders

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**Type of publication:** Article peer review



## Abstract

Occurrences of oil spills are responsible for very significant environmental degradation; they are more likely to happen in areas with dense shipping traffic, or in the close vicinity of transport pipelines and/or other infrastructures used for production and processing purposes. Without international co-operation, individual countries often lack sufficient resources and assets to successfully respond to large-scale oil spill incidents. This can be related to the vast quantities of oil involved in those incidents, or the lack of necessary special equipment for dealing with the tasks at hand by the country under the need to respond. For the successful resolution of oil spill incidents, close and effective international co-operation-especially between neighboring countries that usually “share the burden” of oil pollution-is a vital necessity. On this basis, the South Baltic Oil (SBOIL) project aims to strengthen the existing oil spill response capacities in the South Baltic region, introducing a cross-border spill response tool based on the new ‘green technology’ of biodegradable oil binders (BioBinders). In order for this new concept to be implemented, it is necessary to examine the international and national regulations and guidelines with reference to sorbent use and the exchange of oil spill equipment in the area of interest, and also analyze the national oil spill contingency plans of the different countries involved in the project. After investigating the legal requirements for the utilization of BioBinders in the South Baltic region, the analysis at hand presents the outcomes of a Table Top Exercise that was based on a realistic oil spill scenario in the wider region. This exercise tested the compatibility of international/national/regional plans regarding the use of BioBinders and examined the topics of recovery and waste management, including alternative techniques available for oil spill response. The results suggest that the use of BioBinders is promising, and represents a response option to improve the existing oil spill response capacities in the South Baltic region; the main challenge lies with the difficulty in dealing with waste management, mainly because of the current legislation in place within the participating countries.

**Keywords:** South Baltic region, Oil spills, Biodegradable oil binders, Oil pollution

## Citation

Dalaklis, D., Christodoulou, A., Nilsson, H., Larsson, J., & Pazaver, A. (2020). Enhancing oil spill response capacities in the South Baltic Sea region via cross-border utilization of biodegradable oil binders. *Maritime Technology and Research*, 2(3), 174-186.  
<https://doi.org/10.33175/mtr.2020.238164>

# Attuning to a changing ocean

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**Type of publication:** Article peer review



## Abstract:

The ocean is a lifeline for human existence, but current practices risk severely undermining ocean sustainability. Present and future social–ecological challenges necessitate the maintenance and development of knowledge and action by stimulating collaboration among scientists and between science, policy, and practice. Here we explore not only how such collaborations have developed in the Nordic countries and adjacent seas but also how knowledge from these regions contributes to an understanding of how to obtain a sustainable ocean. Our collective experience may be summarized in three points: 1) In the absence of long-term observations, decision-making is subject to high risk arising from natural variability; 2) in the absence of established scientific organizations, advice to stakeholders often relies on a few advisors, making them prone to biased perceptions; and 3) in the absence of trust between policy makers and the science community, attuning to a changing ocean will be subject to arbitrary decision-making with unforeseen and negative ramifications. Underpinning these observations, we show that collaboration across scientific disciplines and stakeholders and between nations is a necessary condition for appropriate actions

**Keywords:** urban vegetation structure; climate function assessment; mitigation effect

## Citation

Stenseth et al. , (2020). Attuning to a changing ocean. *Proceedings of the National Academy of Sciences*, Aug 2020, 117 (34) 20363-20371; DOI: 10.1073/pnas.1915352117

# Dynamic capabilities and strategic reorientation towards decarbonisation in Baltic Sea shipping

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**Affiliation:** 1) Södertörn University, Sweden

**Type of publication:** Article peer review



## Abstract

Despite the challenges of decarbonisation faced by the shipping sector, this topic has rarely been addressed in sustainability transitions studies. This paper questions common views of established firms as agents resisting change and broadens discussions on the role of incumbents and strategic reorientation. Using the dynamic capabilities approach, we provide a deeper understanding of firms' strategic reorientation over time. Qualitative content analysis is applied to data from interviews, companies' reports and observations to address questions on how and why incumbent shipping firms in the Baltic Sea region reoriented towards decarbonisation in 2007–2018. We demonstrate that the engagement in decarbonisation has been a gradual process, characterised by a shift from reactive strategies to a mixed portfolio of integrated active and proactive innovation strategies. Although firms experiment with decarbonisation through alternative energy solutions, they simultaneously continue to devote considerable attention to less radical innovations such as increased energy efficiency.

**Keywords:** Incumbents; Dynamic capabilities; Reorientation; Maritime transport; Decarbonisation; Innovation strategies

## Citation

Ignė Stalmokaitė, Björn Hassler, (2020). Dynamic capabilities and strategic reorientation towards decarbonisation in Baltic Sea shipping, *Environmental Innovation and Societal Transitions*, Volume 37, 187-202, DOI: <https://doi.org/10.1016/j.eist.2020.09.002>

# Early Lessons of COVID-19 for Governance of the North American Great Lakes and the Baltic Sea

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**Type of publication:** Article peer review



## Abstract

The commitment to advance the protection of the North American Great Lakes and the Baltic Sea continues during the COVID-19 pandemic. The resilience of the research community was displayed as policy decisions were made for the first virtual conferences this year to share scientific findings and expertise in both regions. As this pandemic continues to challenge the world, countries have responded to the threat and continue to deal with the uncertainties of this wicked transboundary problem in many different ways. This article discusses key governance and policy issues that have been revealed thus far that can inform the governance of the transboundary North American Great Lakes and the Baltic Sea. Key lessons from the pandemic include waiting for total scientific certainty to act can lead to fatal consequences and our symbiotic connection with nature. Further insights from the pandemic include the importance of context, science-based leadership, institutional accountability, and acknowledging that nature knows no borders.

**Keywords:** governance; COVID-19; North American Great Lakes; Baltic Sea; science; policy; precautionary principle

## Citation

Jetoo S, Krantzberg G. (2020). Early Lessons of COVID-19 for Governance of the North American Great Lakes and the Baltic Sea. *World.*; 1(3):318-329. DOI: <https://doi.org/10.3390/world1030022>



# Identification of Study Sites for Placement of Sediment Traps in Vegetated Buffer Strips

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**Affiliation:** 1) Slovak University of Agriculture in Nitra, Slovakia, 2) University of Vienna, Austria

**Type of publication:** Article peer review



## Abstract

The aim of this contribution was to outline the decision procedure for selecting potential sites suitable for installing sediment traps in vegetation buffer strips in the Fugnitz catchment, Austria. The selection procedure consisted of GIS data processing where the contributing areas of specific sites were specified according to the selected criteria (i.e. slope above 2°, vegetation strip in between agriculturally used land and river network, contributing area of at least 300 m<sup>2</sup>). Available land use maps were updated with formerly not-digitized structures potentially influencing connectivity (e.g. ephemeral streams and road ditches) which were mapped in the field. From 31 pre-defined sites 15 were selected, taking into account as additional selection criteria the slope angle, soil erodibility and size of the contributing area. Two sites were selected for further investigations – i.e. installation of the sediment traps in vegetation filter strips collecting event-based sediment yields from adjacent arable fields. We conclude that GIS analysis has shown to be useful for the first step-delineation of potential sites of interest on the catchment scale. However, field-based surveys have been shown to be inevitable to obtain on-site information on vegetation characteristics and fine-scale topographic and management information.

**Keywords:** water erosion; sediment delivery; connectivity; buffer strips

## Citation

Pöpl, R., & Aydin, E. (2019). Identification of Study Sites for Placement of Sediment Traps in Vegetated Buffer Strips, *Acta Horticulturae et Regiotecturae*, 22(2), 71-74. DOI: <https://doi.org/10.2478/ahr-2019-0013>

# Effect of Vegetation Structure on Urban Climate Mitigation

**Authors:** Zdenka Rózová<sup>1</sup>, Ján Supuka<sup>2</sup>, Ján Klein<sup>3</sup>, Matej Jasenka<sup>4</sup>, Attila Tóth<sup>2</sup>, and Lukáš Štefl<sup>5</sup>

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**Type of publication:** Article peer review



## Abstract:

Vegetation formations are an important component in the urban structure, as they perform a wide range of ecosystem services there. The climate modification to improve the environmental and residential quality of the city is one of the important functions. The paper presents the results of the microclimate assessment in the chosen localities of Nitra town, Slovakia, with an emphasis on the stage and differences in air temperature and relative humidity. The climate elements were measured at 7 spatially different sites (sites A to G), each of them at two comparative sites, vegetation stand and open area. The largest average air temperature difference between the vegetation stand and the non-vegetation area was 1.2 °C at the locality D. The largest air temperature difference in the vegetation stands was measured between the street space (site E) and the city park (F), reaching 2.3–2.5 °C. The relative air humidity reached the highest differences between the park (locality F) and the street space (G) measured at 3:00–8:00. These reached 19.6% to 24.4% with higher relative humidity in the popular city park. The highest differences between the compared habitats were measured at locality G and averaged 9.6% at 04:00 – 07:00 in a preference to a tree canopy. The research results confirmed the importance of the vegetation structures in the process of mitigating the urban climate extremes and the environmental quality improving.

**Keywords:** urban vegetation structure; climate function assessment; mitigation effect

## Citation

Rózová, Z., Supuka, J., Klein, J., Jasenka, M., Tóth, A., & Štefl, L. (2020). Effect of Vegetation Structure on Urban Climate Mitigation. *Acta Horticulturae et Regiotecturae*, 23(2), 60-65. DOI: <https://doi.org/10.2478/ahr-2020-0013>

# Recognising green infrastructure as a part of the fourth nature concept through university campuses

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**Type of publication:** Article peer review



## Abstract

Every ecosystem on Earth is affected by people as well as has an impact on them. The connection between nature and culture, human knowledge and wisdom of Nature, between us and our environment, is in fact very strong, although sometimes underestimated. It can be promoted by a different way of designing architecture and urban plans – these all should change the quality of our decisions and consequently, once we are acquainted with better options or choices to select, also the quality of our lives will be raised. The Fourth Nature concept is being researched with the goal to identify strategies that create straight connections between culture and Nature, in order to provide humanity with better conditions for living in cities. We are urban beings, living with a current prognosis of being a part of a bigger number of urban dwellers each day. Many different ways the Fourth Nature can be practiced, seen and experienced by in several scales and forms could change our living conglomerates. As valuable places in cities, due to their insertion in the urban tissue and also as coexistence and knowledge development areas, university campuses are here taken to examine this aimed optimal relation between Nature and culture. University campuses have been for centuries an important part of human culture. Creating their own ecosystems, campuses impact on the functioning, sustainability and in the overall also on the appearance of the city, through a blue-green infrastructure implementation and its connections. Within the urban structures, they fulfil their role more significantly and provide important spatial, social, economic, visual and health functions. The area, which is often labelled as public or semi-public space, is thus a part of the blue-green infrastructure and its quality affects also the quality of the surrounding environment. The Fourth Nature is seen as a tool or as a turning point in the current environmental crisis and the university campuses are considered to be the modifiers of the quality of their surrounding environment. The intercrossed analysis of their properties in the current context may bring new ideas and application parameters for the design of the contemporary urban landscape.

**Keywords:** the fourth nature; a blue-green infrastructure; ecosystem services; urban structures

## Citation

Čibik, M., Back Prochnow, S., Stiles, R., & Štěpánková, R. (2020). Recognising Green Infrastructure as a Part of the Fourth Nature Concept Through University Campuses, *Acta Horticulturae et Regiotecturae*, 23(2), 71-75. DOI: <https://doi.org/10.2478/ahr-2020-0015>

# Challenges in Developing a Joint Study Programme: the Case of the Baltic States

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**Type of publication:** Reviewed article



## Abstract

Today students expect that their university will provide them not only with valuable knowledge, skills and competencies, but will also be prestigious and practically accessible both on the daily basis, to diversify and enrich the study process experience, and during global pandemic crises, which will probably remain a serious challenge in the next decades. The topicality of this study is based on the need to overcome the COVID-19 pandemic impact on the European Union higher education system and enhance its competitiveness and shift from traditional to remote study forms that could help students to overcome temporary lockdown situations caused by global pandemic crisis. The aim of the current research was to present the data obtained during the development of the joint master studies-Latvia, Estonia and Lithuania. The specific research tasks were: 1) to justify the need and topicality for creation of joint study programmes and their potential; 2) to characterize the practical implementation of the master studies programme-food Bu study, analysis and synthesis methods, comparative analysis, logical construction and in-depth interviews with the-in the Baltic States. The study reveals that participation in the joint study programme implementation significantly enhances competitiveness of the three involved universities and flexibility in organizing the study process as well as sharing external risks. However, the external threats associated with global pandemic crises have many uncontrollable side effects (lockdown, quarantine, specific hygiene requirements, decreasing of income etc.) that need to be addressed by the universities to be regularly improved and tailored to the joint study programme students' needs.

**Keywords:** competitiveness, agri-food business, remote studies, the Baltic States.

## Citation

Grinberga-Zalite, Gunta & Zvirbule, Andra & Viira, Ants-Hannes & Miceikiene, Astrida. (2020). Challenges in Developing a Joint Study Programme: the Case of the Baltic States. *Turkish Online Journal of Educational Technology*. November 2020. 72-77.

Link to special issue: [http://www.tojet.net/special/2020\\_11.pdf](http://www.tojet.net/special/2020_11.pdf)

# Circular Economy: Can Belarus Close the Loop?

**Authors:** Elena Korshuk<sup>1</sup>, Siarhei Zenchanka<sup>2</sup>, Nadzeshda Antsipenka<sup>2</sup>, Dmitrij Busygin<sup>2</sup>, Henry Sidsaph<sup>3</sup>

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**Type of publication:** Reviewed article



## Abstract

As the world economy attempts to move towards a circular economy, the Republic of Belarus has adopted its “National Strategy for Sustainable Development for the period to 2030” and “National Plan of Action for the Green Economy”, thereby taking the first steps towards creating a circular economy. The purpose of this article is to understand the potential of applying the principles of the circular economy to the economy of the Republic of Belarus. This is the first known article that has directly studied the state of Belarus’ transition towards a circular economy. This article’s findings are based on analyzing the main articles and reports related to the circular economy literature and by analyzing the state of Belarus’ economy in the context of transitioning from a “green” to a “circular” economy. In Belarus, there are some successes in areas of their circular economy transition, such as recycling plastic and construction wastes; however, other areas require further development. A potential limitation of this study is that it only analyzed the main works on the definitions and principles of the circular economy, and therefore wider research may be needed.

**Keywords:** Circular Economy, Sustainable Development, Green Economy, Definition, Principle

## Citation

Zenchanka et al. (2020). Circular Economy: Can Belarus Close the Loop? *Journal of Environmental Research, Engineering and Management*, Vol.76, (4)7–19, DOI: 10.5755/j01.ere.m.76.4.24433

# Rain-flow analysis of plough frame beam

**Authors:** Jozef Rédl<sup>1</sup>, Marian Kučera<sup>1</sup>

**Affiliation:** 1) Slovak University of Agriculture in Nitra, Slovakia

**Type of publication:** Conference proceeding

## Abstract

The article is focused on experimental measurement of the acceleration of plough in certain point of construction and the certain direction. The simplified model of plough allows converting the acceleration into the force. The bending moment function of the plough frame was calculated. Differentiating the bending moment, we got the shear force acting inside the frame profile. The reduced stress function was calculated by Von Misses hypothesis method. The reduced stress function was processed by rain-flow counting method. Histogram of cyclic stress is created from rain-flow analysis.

**Keywords:** steel fatigue; rain-flow; damage criterion; counting methods.

## Citation

Rédl, J., & Marian Kučera. (17-20. September 2019). Rain-flow analysis of plough frame beam. (D. Herak, Ed.) *Proceeding of 7th International Conference on Trends in Agricultural Engineering 2019*(7), 453-458. WOS:000521578500077

Link to access: [TAE2019-077-Jozef-Redl.pdf \(tae-conference.cz\)](https://www.tae-conference.cz/TAE2019-077-Jozef-Redl.pdf)

# Developing Tourism Curriculum Content to Support International Tourism Growth and Competitiveness: An Example from the Central Baltic Area

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**Type of publication:** Article peer review

## Abstract

This article presents an example of developing tourism curriculum content in regional cooperation to support the growth and competitiveness of international tourism in the Central Baltic Area. The whole area should be developed as a common tourism destination, but lack of suitable skills and availability of skilled workforce hinders the development. The necessary skills and knowledge were identified by considering the context and potential applications of skills and knowledge. The data were collected in Latvia and Finland by interviewing the tourism stakeholders (n = 76). The analysis resulted in five categories of skills and knowledge: product and experience development, multi-channel sales and marketing communication, multi-sectorality and cooperation, managing business operations, cultural awareness and internationalization. It can be concluded that the stakeholders identified mostly operational level skills and knowledge required by the SMEs. They did not deem important the skills and knowledge at the strategic level to facilitate management and development of destinations.

**Keywords:** Competitiveness, curriculum development, international tourism, skills, the Baltic Sea, tourism education

## Citation

Sanna-Mari Renfors, Linda Veliverronena & Ilze Grinfelde (2020). Developing Tourism Curriculum Content to Support International Tourism Growth and Competitiveness: An Example from the Central Baltic Area, *Journal of Hospitality & Tourism Education*, 32:2, 124-132. DOI: [10.1080/10963758.2019.1654889](https://doi.org/10.1080/10963758.2019.1654889)



# Change in the Length of the Vegetation Period of Tomato (*Solanum lycopersicum* L.), White Cabbage (*Brassica oleracea* L. var. *capitata*) and Carrot (*Daucus carota* L.) Due to Climate Change in Slovakia

**Authors:** Vladimír Kišš<sup>1</sup>, Ján Čimo<sup>1</sup>, Elena Aydın<sup>1</sup>, Karol Šinka<sup>1</sup>, Andrej Tárník<sup>1</sup>, Peter Halaj<sup>1</sup>, Lucia Toková<sup>1</sup>, Tatiana Kotuš<sup>1</sup>,

**Affiliation:** 1) Slovak University of Agriculture in Nitra, Slovakia

**Type of publication:** Article peer review



## Abstract

Climate change is affecting all sectors of human activities worldwide, including crop production. The aim of the paper was to evaluate the average daily air temperatures measured at one hundred meteorological stations across Slovakia in 1961–2010 and calculate the maximum length of the vegetation period for *Solanum lycopersicum* L., *Brassica oleracea* L. var. *capitata* and *Daucus carota* L. Future trends predictions of the temporal and spatial development across the duration of the vegetation period in Slovakia were elaborated for decades 2011–2020, 2041–2050, 2071–2080 and 2091–2100. Our results show that there was an earlier start to the vegetation period in spring and a later termination in autumn for past 30 years. There is a predicted trend of prolongation of the maximum duration of the vegetation period up to 20 days (*Solanum lycopersicum* L., *Brassica oleracea* L. var. *capitata*) and 15 days (*Daucus carota* L.) in comparison with the reference decade 2001–2010. The maximum vegetation period duration will extend from the south of Slovakia towards the north of the country. The predicted potential increase in crop vegetation periods will be limited by other constraints such as the availability of arable land and soil water availability.

**Keywords:** climate change; vegetation period; average temperature; map outputs; changes of temperature

### **Citation**

Čimo J, Aydın E, Šinka K, Tárnik A, Kišš V, Halaj P, Toková L, Kotuš T. (2020). Change in the Length of the Vegetation Period of Tomato (*Solanum lycopersicum* L.), White Cabbage (*Brassica oleracea* L. var. *capitata*) and Carrot (*Daucus carota* L.) Due to Climate Change in Slovakia. *Agronomy*. 10(8):1110. DOI: <https://doi.org/10.3390/agronomy10081110>

# General public reactions to carbon capture and storage: Does culture matter?

**Authors:** Farid Karimi<sup>1</sup>, Arho Toikka<sup>2</sup>

**Affiliation:** 1) Novia University of Applied Sciences, 2) University of Helsinki, Finland

**Type of publication:** Article peer review

## Abstract

We scrutinise the controversial carbon capture and storage (CCS) technology from a cross-cultural perspective. The reaction of the public to CCS will considerably affect the development of the technology. Previous research has identified general and local mechanisms in how the general public reacts to CCS. Researchers have noticed that differences exist between countries, but the effects of cross-cultural differences have not been explored in detail. We argue that it is crucial to understand how public perceptions of the technology emerge and form in their individual contexts or embedded in large-scale cultural frameworks.

Public reaction to CCS is structured in two dimensions—risk perception and benefit perception—and we design a model with individual and national cultural level predictors. We indicate that effects of individual level variables such as familiarity with technology, or sociodemographic variables such as education, are important but their effects are likely mediated and confounded by the cultural setting people operate in. The results show that, in parallel with other factors such as trust, risk perception is affected by cultural dimensions such as uncertainty avoidance and the society's short-term or long-term orientation.

We provide a framework to understand why and how societies challenge the technology.

## Keywords

Carbon capture and storage, National culture, Social acceptability, Risk perception, Climate change, Energy policy, Social acceptance

## **Citation**

Farid Karimi, Arho Toikka, (2018) General public reactions to carbon capture and storage: Does culture matter? *International Journal of Greenhouse Gas Control*, Volume 70, Pages 193-201. DOI: <https://doi.org/10.1016/j.ijggc.2018.01.012>.

# Learning for and about sustainability in higher education – a regional perspective based on experiences from the Baltic and the Mediterranean

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**Affiliation:** 1) Åbo Akademi University, Finland, 2) University of Athens, Greece, 3) MIO-ECSDE, Greece

**Type of publication:** Case study

## Abstract

The purpose of the paper is to present and compare collective efforts of higher education institutions working through regional networks in introducing and promoting education for sustainable development (ESD) and environmental education (EE) in two most significant EU boarder regions. Efforts to support EE/ESD in higher education are usually undertaken at individual universities and, in some cases, at national level, still remaining very fragmented; therefore, the examples of University networks in the Baltic and the Mediterranean regions are of particular interest and importance. Both regions have regional conventions, protocols and strategies for the relevant seas, bringing EU and neighboring countries of the regions together for the protection of the environment and the promotion of sustainable development (SD) within which EE and ESD are embedded.

This paper presents the driving forces for the establishment, evolution and design of relevant activities of these two networks, making also a few inter-comparisons and recommendations for further improvements.

Both regions, the Baltic and the Mediterranean, have multiple needs and high potential for more efficient linking of SD with higher education. Early enough it was realised that regional networking could stimulate countries and universities towards this task. Two networks were set up: the Baltic University Programme (starting already in 1991) and the Mediterranean Universities Network for SD focusing on ESD (starting in 2007). The paper reviews main activities of the networks together with lessons learned and gives directions for their future operations.

This paper is one of the rare case studies related to higher education networking on ESD and demonstrates how networking on ESD, apart from enhancing professional development, supports also SD and promotes cooperation and peace in regions that have a history of frequently turbulent relationships.

**Keywords:** Sustainable Development, Competence Development, Baltic University Programme, MedUnNET, Regional/international cooperation

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