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► **To cite this version:**

Dimitra Gaki, Serafim Felekis, George Vlahos, Irina Herzon, Maite Puig de Morales Fusté, et al.. Innovative education for sustainable development in peripheral rural areas. International Conference on Information and Communication Technologies in Agriculture, Food and Environment,, Sep 2022, Athènes, Greece. pp.480-487. hal-03889103

**HAL Id: hal-03889103**

**<https://hal-ciheam.iamm.fr/hal-03889103>**

Submitted on 7 Dec 2022

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# Innovative Education for Sustainable Development in Peripheral Rural Areas

Dimitra Gaki<sup>1</sup>, Serafim Felekis<sup>1</sup>, George Vlahos<sup>2</sup>, Irina Herzon<sup>3</sup>, Maite Puig de Morales Fusté<sup>4</sup>, Tristan Berchoux<sup>4</sup>, Ruth BennettCoady<sup>5</sup>, Ionel Mugurel Jitea<sup>6</sup>, Yanka Kazakova<sup>7</sup>, Myriam Kessari<sup>4</sup>, Olgica Klepac<sup>8</sup>, Valentin Mihai<sup>6</sup>, James Moran<sup>5</sup>, Snježana Tolic<sup>8</sup> and Marija Roglic<sup>8</sup>

<sup>1</sup> University of Thessaly, Greece

<sup>2</sup> Agricultural University of Athens, Greece

<sup>3</sup> University of Helsinki, Finland

<sup>4</sup> International Center for Advanced Mediterranean Agronomic Studies, Institute of Montpellier, France

<sup>5</sup> Galway-Mayo Institute of Technology, Ireland

<sup>6</sup> University of Agricultural Sciences and Veterinary Medicine of Cluj Napoca, Roumania

<sup>7</sup> University of National and World Economy, Bulgaria

<sup>8</sup> University of Osijek, Croatia

## Abstract

This paper aims to present the results of the Erasmus + RUR'UP project that developed educational tools for scientists, public managers, practitioners, and agricultural advisors living and working in peripheral rural areas. Based on the assessment of the educational needs and gaps for the sustainable development of the EU peripheral rural areas of Greece, Bulgaria, Romania, Croatia, Finland, Ireland and France via a participatory innovation process, we have developed: an asynchronous e-learning course and supporting educational materials. The objective was to provide educational tools that will help the professional competencies of the Higher Education (HE) institutions working with peripheral rural regions by answering to the labour market and societal needs in these regions, thereby strengthening the collaboration between higher education and regional and cross-regional employers. The project resulted in 50 students who attended the e-learning course and the development of Open-Access educational materials with pedagogically sound activities associated with them, which can be used by any actor interested in the sustainable development of peripheral rural areas, especially those with high natural values in the form of a Virtual Bank of Case studies that gathers 14 examples of case studies.

## Keywords

Sustainable rural development, peripheral rural areas, innovative education, participatory process.

## 1. Introduction

EU peripheral rural areas cover almost 30% of the utilised agricultural area and nearly 15% of agricultural holdings [1]. They are of the most significant importance for rural livelihoods, cultural heritage, biodiversity, and ecosystem services such as carbon sequestration and water retention (SDG for United Nations Sustainable Development Goals: SDG8-Decent Work and Economic Growth,

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Proceedings of HAICTA 2022, September22–25, 2022, Athens, Greece

EMAIL: dimgaki@uth.gr (A. 1); sfelekis@engineer.com (A. 2); gvlahos@aua.gr (A. 3); iryna.herzon@helsinki.fi (A. 4);

puigdemorales@iamm.fr (A. 5); berchoux@iamm.fr (A. 6); ruth.bennettcoady@gmit.ie (A. 7); mjitea@usamvcluj.ro (A. 8);

yanka.kazakova@gmail.com (A. 9); kessari@iamm.fr (A. 10); olgica.klepac@fazos.hr (A. 11); valentin.mihai@usamvcluj.ro (A. 12);

james.moran@gmit.ie (A. 13); snjezana.tolic@fazos.hr (A. 14); m.roglic@montpellier-bs.com (A. 15)

ORCID: 0000-0003-1222-731X (A. 1); 0000-0002-1820-2001 (A. 3); 0000-0002-8884-0500 (A. 4); 0000-0003-4095-2164 (A. 6); 0000-0002-3862-4332 (A. 8); 0000-0003-3406-9885 (A. 9); 0000-0002-2866-0276 (A. 10); 0000-0002-2845-4325 (A. 13); 0000-0003-2851-9974 (A. 14); 0000-0003-4900-4232 (A. 15)



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CEUR Workshop Proceedings (CEUR-WS.org)

SDG15-Life on Land, SDG13-Climate Action). Additionally, these areas contain a vast part of the EU's biodiversity capital and a series of traditional farming practices. They contribute meaningfully to the local economy due to the small-scale production procedures they maintain and the unique geographical conditions. Depopulation, for instance, drains them of human capital and forces entrepreneurs to acquire various skills and competencies. Producers often face a complex dilemma in modernising production while avoiding potential wider social and environmental damage inflicted by the process. Despite their importance for rural livelihoods, cultural heritage, biodiversity, and ecosystem services such as carbon sequestration and water retention, these areas face social, political, and environmental pressures. Higher education is essential in achieving sustainable development goals (SDGs), specifically in peripheral rural areas that face isolation and often fall under the radar of mainstream education and development.

To answer these challenges, the Erasmus + RUR'UP project developed educational tools for scientists, public managers, practitioners and agricultural advisors living and working in these areas. Seven European universities and institutions commonly implemented them.

In what follows, we will present the research context, methodology and the key results of the Erasmus + project RUR'UP.

## 2. Research Context

RUR'UP project builds on the work carried on under HNV-Link project, an H2020 thematic network (2016-2019) that focused on the work with local actors in High Nature Value (HNV) farmland that aimed at demonstrating how so-called HNV brokers can be engaged with other regional actors for HNV conservation [6].

It uses local examples to show how innovations can be mobilised to conserve HNV farming systems. The work of this thematic network pointed out the importance of means and knowledge when dealing with high nature-value farmlands in peripheral rural areas [6]. The network identified two critical gaps in the HE fields in its innovation brokering work in 10 European HNV farming regions.

Firstly, interdisciplinary curriculum approaches commonly lack understanding and developing farming innovations. Secondly, the specific problems faced by farms in these regions (poor access to face-to-face advisory, lack of awareness of innovative marketing modes, absence of skilled human resources (including digital skills), lack of organisational and governance skills, etc.). Thirdly, the key target groups for HE are at the heart of the RUR'UP project. Students, teaching and training personnel, researchers and innovation actors such as farmers, agribusinesses, local action groups, NGOs and administrations work in and with peripheral rural areas. The work with this group of actors revealed their need to learn in a flexible and continuous (life-long learning) way, to work collaboratively and be able to work creatively with innovation in a problem-based context.

To sum up, the HNV-Link thematic network identified the necessity for non-members of the higher education institutions that engage in knowledge brokering to access educational materials they could use for self-learning and advisory needs. Therefore, Erasmus + RUR'UP developed educational materials to answer this "brokerage" need. The objectives of the RUR'UP project were:

1. To gain an understanding of the specific skills and competencies needed by the labour market and societal needs in the peripheral rural areas
2. To support curricula development that will ensure the attainment of critical skills and competencies
3. To strengthen the collaboration between HE and potential regional and cross-regional employers
4. To support the professional competencies of the higher education educators in such regions and working with such regions
5. To contribute to the international pool of open educational resources (OER)

We will proceed to present the methodology mobilised in developing our educational materials.

### 3. Methodology

To reach our objectives, we have adopted a stepwise approach. First, we have assessed the educational needs and gaps for the sustainable development of the EU peripheral rural areas to identify the learning gaps. Secondly, we have engaged in a transdisciplinary process to prepare the open educational resources (OER) and an adaptable curriculum. Thirdly we have built on the innovation processes identified within HNV-Link to develop a bank of case studies that will support the course. Thirdly we have engaged in a pilot implementation of the e-course via an online learning platform proposing it as an elective course within our universities. Fourthly, we have developed an open syllabus that addresses HE institutions and local actors. Lastly, we have developed a reflective report on the approach and the methodology adopted to reach the project objectives to evaluate the effectiveness with which the developed educational materials have answered the identified educational needs and gaps for sustainable development of the EU peripheral rural areas.

#### 3.1. The Assessment of the Education Needs and Gaps for the Sustainable Development of the EU Peripheral Rural Areas

To identify the educational needs and gaps, we first conducted structured internet searches to review the current programs and curricula developed in the EU tertiary education systems for the sustainable development of the peripheral rural areas. We have focused on the bachelor's and master's programs designed in Bulgaria, Croatia, Greece, Finland, France, Ireland and Romania.

As there is no common understanding of what peripheral rural areas are, we have focused on investigating the curriculum that provides graduates and stakeholders working in mountain regions that are characterised as areas handicapped by a short growing season because of a high altitude or by steep slopes, or by a combination of the two at a lower altitude, HNV, natural park or Natura 2000 sites.

We have focused on the programs that provided education in disciplines relevant to the four HNV innovation types: regulatory, technical, social and the market, as identified by the HNV-Link thematic network as necessary for the sustainability of such areas.

This was complemented by the criteria established by the United Nations as Key sustainable development goals:

1. Decent work and economic growth
2. Life on Land

We have complemented these criteria with definitions used to identify the role of the peripheral rural areas in the geographical pool of students and the academic degree levels [4]. See figure 1.

Institution		Program								Content of the program															
Name	Official web-site (where possible in English)	Agricultural peripheral areas in the catchment area (Yes/No) (1)	Type of agricultural peripheral area (mountain, HNV, natural park or Natura 2000 site, other)	Name of the program	Official website (where possible in English)	Level: bachelor/master	Title (2)	Program targeting peripheral areas (Yes/No) (3)	Adult learning (Yes/No) (4)	Graduates (number/not available)	ECTS /Hours	Lectures dedicated to peripheral agricultural areas (multiple lines where needed) (5)	ECTS /Hours (No/Yes-mention number/Not available)	Type of (mandatory/optional)	Link to curricula	Key competences									
																Decent work & economic growth(6)			Life of Land (7)						
																Lectures (multiple lines where needed)		ECTS/H	Specific to peripheral areas(Yes/No)		Lectures (multiple lines where needed)		ECTS/H	Specific to peripheral areas(Yes/No)	

Figure 1: Curricula analysis of the bachelor and master's programs (source: RUR'UP project from own data)

In the second step, with the scope to better understand the needs of professionals working in peripheral rural areas, we have used focus groups and surveys to develop an in-depth understanding of the knowledge and skills practitioners need. We have expanded on the existing community of practitioners developed at the local level within the HNV-Link thematic network. This ecosystem

included farmers' associations, local action groups, AgroClusters, advisory services, educators, consultants and actors working in the public sector at the local and regional levels.

Using the focus group technique, we have investigated the needs in six cross-education themes:

1. Social and institutional innovation skills
2. Regulation and policy needs
3. Products and markets
4. Farming practices and management
5. Soft skills

Due to the SARS-COV-2 lockdown, the partners who could not organize focus groups have sent an online survey to 11 to 20 stakeholders from 1. Farmers and small industry; 2. Local action groups or AgroClusters and farmers' associations' representatives; 3. Advisory services, educators, or training providers. 4. Employed or residents in peripheral rural areas; 5. NGO representatives; and 6. Governmental bodies.

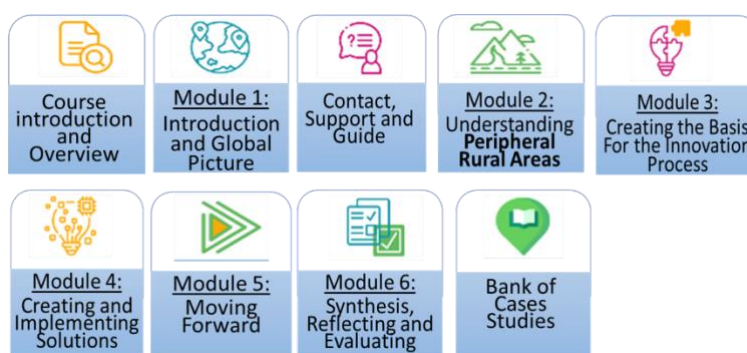
### 3.2. Development of the RUR'UP e-Course "Sustainable Development in Peripheral Rural Areas in the EU"

Based on the assessment done in the previous step, we have developed a 6-module course, "Sustainable development in the peripheral rural areas in the EU" that was attended by 50 students from 7 countries in the spring semester of the academic year 2021/2022. The modules are presented in Figure 2.

During the course, the students have worked on real-life examples of innovation processes in Bulgaria, Croatia, Greece, Finland, France, Ireland and Romania. The scope was to engage in problem-solving as a way for students to broaden their understanding of peripheral rural areas' social, environmental, and economic characteristics. The students were asked to recognise the needs and opportunities for sustainable development and to engage in the participatory innovation process, with diverse innovations as potential solutions to the identified challenges.

All the course and learning activities took place on the CPD Learnonline.ie online platform run by GMIT, the Irish partner in the project. Activities were in English. A selection of students succeeding in the course attended RUR'UP Summer School in Greece during the summer of 2022.

The learners who completed the educational process were awarded with a total of 3 digital badges as a recognition of the knowledge and skills acquired: a Digital Badge after the completion of module 3 (explorer badge), a second Digital Badge after the full completion of the e-learning course (Graduate badge), and a digital Badge after the completion of the Summer School.



**Figure 2:** E-course modules "Sustainable development of peripheral rural areas in the EU" (Source: RUR'UP e-course module's presentations, from CDP Learning online platform)

The EPALE platform (online platform for adult education in Europe) was used to disseminate the produced content. In addition, the project has created a RUR'UP content under the UE platform EPALE

(Electronic Platform for Adult Learning in Europe) for wider public dissemination of the course content, amongst other project content and productions, as the overall Virtual Bank of Case Studies.

### 3.3. Development of the Intensive Study Activity: RUR'UP Summer School in Greece

Building on the e-course, we have developed a 7-day intensive study activity during which the students have built upon and developed the skills acquired during the e-course:

1. Broad understanding of social, environmental, and economic characteristics of Peripheral Rural Areas in their regional contexts
2. Insights into the participatory innovation process
3. Awareness of the variety of existing innovations of relevance and their transferability across contexts
4. Practice international collaborative work, also with diverse stakeholders in English

We will proceed to present the results of the abovementioned approaches.

## 4. Results

To produce higher education tools for scientists, public managers, practitioners and agricultural advisors working and living in peripheral rural areas facing social, political and environmental pressures, we have joint upjoined actors from peripheral rural areas.

Firstly, we have produced a report that delineates the identified gaps in the HE relating to peripheral rural areas and the needs of the local actors (working on those areas). Figure 3 identified the gap between the knowledge and the skills that graduates acquired and the knowledge and skills required by local actors to work in such areas.



**Figure 3:** Identified skills needed by future graduates to improve the sustainability of the peripheral rural area (source: RUR'UP project, from own data)

Employers and practitioners from project peripheral rural areas pointed out as relevant a holistic and in-depth understanding of interactions between land use, environment, and economy related to the peripheral rural areas. This was an element we have already found in existing masters' programmes in the form of either technical knowledge or more focused on the socio-economic aspects. However, none of the programmes brings these two elements together.

What was judged as essential but missing from the HE curricula was the knowledge to use production techniques in a way that is respectful to the agrobiodiversity and work on diversification of agricultural products that will be supported by collective marketing actions, as well as the education of the existing public policies that will be followed with examples allowing the students to use it for

problem-solving. Problem-solving is a way to find a gap representing an opportunity for developing multifunctional exploitation, agritourism business or handicraft.

Secondly, building on the identified gaps, we developed an e-course consisting of the following six modules:

In module one, students learnt about critical strategic issues in sustainable development and key particularities of those areas. The module provided links to educative tools on sustainable development strategies (e.g., Videos and papers)

In module two, the students learnt on baseline assessment and how to elaborate a territorial diagnosis. They were introduced to their peripheral rural area (PRA) case study. In this module, the students explored their case study's social, environmental, and economic characteristics and were taught how to identify the main weaknesses of PRAs. The students were asked to use mind mapping methodology to holistically explore a complex case study.

In module three, the students learnt the basics of the innovation and participatory innovation processes. The students were asked to recognize the role of participatory visioning and the importance of actors in territorial development. They were also asked to identify the innovation needs in their PRA case study.

In module four, the students learnt on the innovations of PRA and were requested to identify critical elements of an innovation process relevant to their case study area; to evaluate how a specific innovation case follows an innovation process and recognise the needs for innovation bundles.

In module five, the students were introduced to the innovation brokering process of a project. They learnt on the strategies and key points of the innovation transfer, dissemination and communication and capitalization elements and were requested to recognise the role of innovation transfer for the sustainable development of PRA. The objective was to make students aware that the process does not stop with an innovation implementation but continues through innovation exchange, transfer and dissemination.

In module six, the e-course student portfolio, the students submitted the e-course overall portfolio where they should include own reflection linking the innovation process in their case study area to the EU policies and the UN Sustainable Development Goals, by writing a 400 words essay.

Thirdly, we have developed a Virtual Bank of Case Studies on innovative sustainable development for peripheral rural areas. These case studies were part of the e-course and are made available as an open source through the EPAL platform. We developed pedagogical RUR'UP Case study materials for advisors, practitioners and academia providing guidelines on territorial examples. Alongside we have also developed materials for teachers and trainers on how to deliver innovative education on sustainable development in peripheral rural area. This material is linked to the 7 RUR'UP Case studies and cover the following domains:

1. Analysis of the key points of a baseline assessment
2. Mind mapping tool
3. Organising and conducting an efficient farming demonstration event
4. Identifying vulnerabilities and adaptive capacities of a territory
5. Stakeholder analysis in participatory innovation process
6. Introducing Innovation types
7. Building participative projects in peripheral rural areas

Fourthly, we have organised a Summer School in Greece (July 2022). This pilot in-field teaching and training course included collective work in groups, field research and presentation of results.



**Figure 4:** Summer school in Greece (source: pictures from RUR'UP consortium)

Lastly, we have developed Digital Badges to recognise student's learning, knowledge and skills gains. Digital Open Badges provide unlimited ways of communicating knowledge, skills, and competencies. In the course of RUR'UP project, they were used to validate key milestones reached within the online course and skills the student has acquired in each stage of the course. The Digital Badge is in the form of an online certificate that contains the metadata which describes: the name of the badge, its description and criteria page. We have developed in total three digital badges, two for the e-course and one for the completion of the summer school these were:

1. RUR'UP Explorer badge – awarded after module 3
2. RUP'UP Graduate badge – awarded upon the submission of the portfolio (module 6) and a completion of the course
3. RUR'UP Summer School badge – awarded upon the completion of the summer school.

## 5. Conclusion

The results of the Erasmus RUR'UP project answer to the identified gap for educational materials for students and practitioners working with and in peripheral rural area.

The developed asynchronous learning course and supporting educational materials contribute to the educational materials for sustainable rural development within Europe, and beyond.

## 6. Acknowledgements

This paper has received funding within the Erasmus + project RUR'UP. Project number 2020-1-EL01-KA203-079121.

The authors would like to thank all the local actors and practitioners that have participated in this project and the students that attended the e-learning course and the summer school in Greece of the project RUR'UP in the academic year 2021/2022.

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